

Bulletin of the Museum of Comparative Zoology

AT HARVARD COLLEGE

Vol. 119, No. 1

REVISION OF FIVE AFRICAN SNAKE GENERA

By ARTHUR LOVERIDGE

CAMBRIDGE, MASS., U. S. A.

PRINTED FOR THE MUSEUM

JULY, 1958

No. 1 — *Revision of Five African Snake Genera*

By ARTHUR LOVERIDGE

CONTENTS

	Page
Introduction and Acknowledgments	1
Genus <i>Lycodonomorphus</i> Fitzinger (key on page 7)	6
Genus <i>Natriciteres</i> Loveridge (key on page 26)	25
Genus <i>Philothamnus</i> Smith (key on page 52)	49
Genus <i>Prosymna</i> Gray (key on page 129)	127
Genus <i>Chilorhinophis</i> Werner (key on page 169)	168
Bibliography	179

INTRODUCTION AND ACKNOWLEDGMENTS

This paper represents the author's last attempt at revising snake genera. The five dealt with here were selected because of the confused status of their component species, and this required elucidating in connection with the report on Nyasaland reptiles. The work was undertaken about 1950. The typescript was then laid aside with the intention of borrowing certain snakes on which questionable records were based, also in the faint hope of completing the African COLUBRIDAE, to which family these five genera belong. Eleven other colubrid genera have been dealt with already in three contributions to this Bulletin published in 1939, 1940 and 1944.

The procedure and format of the current contribution is essentially that of its predecessors, i.e. an attempt to synopsise all pertinent information appertaining to every species assigned to the genera under review. In the present instance the period covered is from 1880 to 1956, though the last year is possibly incomplete.

However, in the case of *Lycodonomorphus* Fitzinger, with which I synonymize *Glypholycus* Günther, I have treated the

little-known¹ *bicolor* of Lake Tanganyika in greater detail than usual. This is due to the collaboration of C. J. P. Ionides, Esq., who generously procured more than 100 specimens of this aquatic reptile for study. The astonishing variation displayed by this fine series is published here for the first time. One might add that Mr. Ionides also submitted comparably large quantities of at least one species for each of the four remaining genera.

Others in Africa who have aided this investigation by sending in material recently, are Messrs. D. C. Broadley (Southern Rhodesia), D. Vesey-FitzGerald (Northern Rhodesia), M. C. Lesage (Ghana) and J. S. Owen (Sudan).

During, and subsequent to, 1950 my esteemed colleague Dr. R. F. Laurent of the Musée Royal du Congo Belge has added several interesting species to the genera *Lycodonomorphus* and *Prosymna*. With the latter genus, Laurent's extensive West African material enabled him to clarify the situation respecting the races of *ambigua* occurring in the Belgian Congo. Though time and the accumulation of more material may demonstrate that two of these forms are untenable, I have accepted his arrangement except in one instance. Fortunately for me Laurent's researches prevented my merging *a. bocagii* with *a. ambigua*, something I was preparing to do because of the confusing misidentifications of *bocagii* in the literature, as may be seen from its synonymy. In acknowledgement of this, and as a tribute to Laurent's contributions to African herpetology, I take pleasure in naming the only novelty described in this paper:

PROSYMNA MELEAGRIS LAURENTI subsp. nov.

Circumstances have made it quite impossible for me to borrow paratypes of Laurent's new forms as I should have done if not so pressed for time. In other respects I have endeavoured to bring these revisions up to date as of 1956. At the time (*ca.* 1950) I first did them I borrowed much material or pestered herpetological correspondents for information respecting specimens in their care. For either one or the other I am indebted to the undermentioned colleagues and gladly avail myself of this opportunity of expressing my thanks.

¹ This was written before seeing Laurent's 1956 paper listing 133 specimens!

J. R. Bailey (Duke University); J. C. Battersby (British Museum); C. M. Bogert (American Museum of Natural History); G. S. Cansdale (Lyndale Avenue, London); B. S. Chauhan (Zoological Survey of India); D. M. Cochran (United States National Museum); R. Conant (Zoological Society of Philadelphia); J. Eiselt (Naturhistorische Museum, Vienna); V. F. FitzSimons (Transvaal Museum); J. Guibé (Paris Museum); N. Hartweg (Michigan University Museum); A. Holm (Zoological Museum, Uppsala); R. F. Laurent (Musée du Congo Belge); R. Mertens (Senckenberg Museum); M. G. Netting (Carnegie Museum, Pittsburgh); H. W. Parker (British Museum); J. A. Peters (Brown University, Providence); C. R. S. Pitman (Chelsea, London); M. Poll (Musée du Congo Belge, Tervueren); C. H. Pope (when at Chicago Nat. Hist. Mus.); H. Rendahl (Naturhistoriska Riksmuseet); W. Rose (South African Museum, Capetown); K. P. Schmidt (Chicago Natural History Museum); B. Shreve (Museum of Comparative Zoology); R. H. Smithers (National Museum, Bulawayo); O. van Straelen (Institut Royal de Belgique); P. E. Vanzolini (Departamento de Zoologia, São Paulo); H. Wermuth (Zoologisches Museum, Berlin); O. Wettstein (Osterreichische Akademie, Vienna); E. E. Williams (Museum of Comparative Zoology); G. F. de Witte (Institut Royal de Belgique).

When necessity arose to refer to this borrowed, or other, material, the institution where it may be found is indicated by the following abbreviations:

A.M.N.H., American Museum of Natural History, New York; B.M., British Museum (Natural History), London; C.M., Carnegie Museum, Pittsburgh; C.N.H.M., Chicago Natural History Museum, Chicago; I, Ionides field number; I.R.B., Institut Royal de Belgique; M.C.Z., Museum of Comparative Zoology, Cambridge; P.M., Museum National d'Histoire naturelle, Paris; R.G.M.C., Musée Royal du Congo Belge, Tervueren; S.M.F., Senckenbergische Naturforschende Gesellschaft, Frankfurt, a.M.; S.R.M., Southern Rhodesia Museum, Bulawayo; T.M., Transvaal Museum, Pretoria; U.S.N.M., United States National Museum, Washington.

Localities. An asterisk (*) *in front of* a place name implies that a specimen or specimens from said locality is either in the collection of the Museum of Comparative Zoology or has been

examined for this revision — as in the case of types studied at the British Museum in 1951. For one species only (*Lycodonomorphus r. rufulus*) the asterisk is placed after the locality to indicate that the material from these places is in the Transvaal Museum and was examined for me by Dr. V. F. FitzSimons with his customary kindness.

Bibliography. Owing to the spate of semi-popular books on snakes that have appeared in recent years, it is becoming increasingly difficult to know what should, or should not, be included. Where a date is followed by a letter of the alphabet it indicates that during the year cited the author in question published more than one paper on African herpetology. The letter has chronological significance in a more comprehensive bibliography of African Herpetology (1880-1953) which it is hoped may be published in the not too-distant future.

Family COLUBRIDAE

Genus LYCODONOMORPHUS Fitzinger

1843. *Lycodonomorphus* Fitzinger, Syst. Rept., p. 27. Type by original designation: *Coronella rufula* Schlegel = *Coluber rufulus* Lichtenstein.
1848. *Lycodontomorphus* Agassiz, Nomen. Zool. Index Universalis, p. 628. Emend. for *Lycodonomorphus* Fitzinger.
1863. *Neusterophis* Günther, Proc. Zool. Soc. London, p. 16, footnote. Type by monotypy: *Natrix laevissima* Günther.
- 1893b. *Ablabophis* Boulenger, Cat. Snakes Brit. Mus., 1, p. 318. Type by monotypy: *Coluber rufulus* Lichtenstein.
- 1894b. *Glypholyceus* Günther, Proc. Zool. Soc. London, p. 629. Type by monotypy: *G. bicolor* Günther.
- 1924b. *Xerophidion* Werner, Sitzb. Akad. Wiss. Wien, 133, Abt. 1, p. 53. Type by monotypy: *N. hypsirhinoides* Werner = *Glypholyceus bicolor* Günther.

Definition. Maxillary teeth 18-25,² small, subequal; mandibular teeth longest anteriorly. Head slightly distinct from neck; eye

² In giving 18-19 for *bicolor*, possibly Cott (1935, p. 965) failed to allow for a missing tooth; there are clearly 19 in a ♀ skull (M.C.Z. 54091) and appear to have been 20 in another (M.C.Z. 30076). Günther said "about 21" for the type, while Boulenger (1896d, p. 615) merely stated that the dentition of *Glypholyceus* was similar to that of *Lamprophis* and *Bothrolyceus*. However, Laurent (1954b, p. 43) gives 19-20 teeth for both his s. *subtenuatus* and s. *upembae*.

moderate, with round or vertically subelliptic pupil; nostril directed upwards, in a semi-divided or divided nasal; a loreal; preoculars 1, rarely 2; lateral head shields separated by an inconspicuous groove from the upper labials. Body cylindrical; scales smooth, with or without apical pits, in 19-25 rows; ventrals rounded; anal entire, rarely divided. Tail moderate, tapering; subcaudals paired.

Hemipenis of male not (*bicolor* and *subtaeniatus*) or distally bifurcate (*rufulus*); sulcus spermaticus forked. Hypapophyses present posteriorly in the vertebral column.

Range. African lakes and rivers south of 3° S.

Remarks. For earlier comments on the status of this genus and the number of pterygoid teeth, see Loveridge (1953e, p. 253) and Laurent (1954b, pp. 38-43). As Laurent's admirably described species and its race bridge the gap between *bicolor* and *laevissimus* in the west, as do *r. mlanjensis* and *r. whytii* between *bicolor* and *rufulus* in the east, there no longer remains any valid reason for retaining *Glypholycus* as a distinct genus. Bogert, on whose work (1940, pp. 18-19) I have depended in respect to dentition, hemipeneal and hypapophyseal characters, concurs in this view.

It is true that in *bicolor* the 4th labial is the only one to normally enter the orbit, whereas in all the other species both 4th and 5th are normal, and the 4th only is very exceptional. Such a character, however, cannot be considered of generic significance.

Key to the Species

Our knowledge of the full range of ventral and subcaudal counts is so incomplete for certain forms, while in others the known counts display so much overlapping, that it appears next to impossible to devise a key that reflects relationships. However, if ranges are taken into account, and the table of statistical data that follows the key is consulted, the identification of specimens should be greatly simplified.

1. Midbody scale-rows 23, rarely 25 (25 present in only 2 of the 110 snakes examined); range: only Lake Tanganyika *bicolor* (p. 9)
- Midbody scale-rows 21 to 23 (21 chiefly in ♂♂, 23 in ♀♀); range: western Angola and western Belgian Congo 2
- Midbody scale-rows 19 to 21; range: eastern Belgian Congo and southern Nyasaland 3

- Midbody scale-rows 19, rarely 21 (21 present in only 2 of about 20 records of *laevissimus*); range: southern Tanganyika Territory; northern Nyasaland and Africa south of the Zambezi 4
2. Subcaudals 29-40 (♀ ♀ 29-34; ♂ 40); ventrals 172-188 (♂ 172; ♀ ♀ 175-188); range: southeastern Belgian Congo *s. upembae* (p. 12)
 Subcaudals 41-58 (♀ ♀ 41-48; ♂ ♂ 52-58); ventrals 175-193 (♂ ♂ 175-180; ♀ ♀ 189-193); range: western Belgian Congo and western Angola *s. subtaeniatus* (p. 13)
3. Throat of adult whitish to gray; belly mostly black sparsely flecked with cream; tail below entirely, or almost entirely, black (a young one under 230 mm. in total length, pure white; juveniles from 250-600 mm. gradually assume adult coloring, that is of 600-800 mm. specimens); range: montane streams of eastern Belgian Congo from north end of Lake Tanganyika to region of Lake Upemba
 *r. leleupi* (p. 14)
 Throat of adult to anus immaculate white; tail from anus to near its tip white with a dusky median line; range: montane streams of Zomba, Mlanje and Cholo Mountains, southern Nyasaland
 *r. mlanjensis* (p. 16)
4. Subcaudals less than 50 (but that of ♂ ♂ unknown); range: southern Tanganyika Territory (where they approach *leleupi* in color) to northern Nyasaland; possibly also Charre, Mozambique
 *r. whytii* (p. 17)
 Subcaudals more than 50 (54 to 81; those reported as having less than 54, which I have examined, all had regenerated tail tips); range: south of the Zambezi 5
5. Loreal well separated from first labial; ventrals 160 to 178; subcaudals 54 to 78; pupil subcircular, rarely round; no light line from behind eye to above corner of mouth; upper labials immaculate; underside immaculate or, at most and that but rarely, a few dusky marks; range: streams of Southern Rhodesia and Bechuanaland, south to Natal, west to the Cape *r. rufulus* (p. 19)
 Loreal in contact with first labial or, if separated, only by a granule; ventrals 172 to 183; subcaudals 58 to 81; pupil round; a more or less light line from behind eye to above corner of mouth; upper labials spotted; underside from throat to end of tail with a dusky median line or occasionally a median series of dusky markings; range: Transvaal (1 record), south to Natal (1 record), east through Cape Province *laevissimus* (p. 23)

STATISTICAL DATA FOR THE SPECIES OF
LYCODONOMORPHUS

(Abnormal variations are given in parentheses)

Species	Midbody scale-rows	Male ventrals	Female ventrals	Female subcaudals	Male subcaudals
<i>bicolor</i>	23(-25)	154-164	152-166	52-59 ³	63-71 ⁴
<i>s. upembac</i>	21-23	172	175-188	29-34	40
<i>s. subtaeniatus</i>	21-23	175-180	189-193	41-48	52-58
<i>r. leleupi</i>	19-21	165-171	164-174	52-61	65-67
<i>r. mlanjensis</i>	21	163-167	169	51	60-71
<i>r. whytii</i>	19	?	159-172	37-47	?
<i>r. rufulus</i>	19	162-175	160-178	54-79	72-78
<i>laevissimus</i>	19(-21)	172-181	172-183	58-69	76-81

LYCODONOMORPHUS BICOLOR (Günther)

- 1894b. *Glypholycus bicolor* Günther, Proc. Zool. Soc. London for 1893, p. 629, fig. 1: Shores of Lake Tanganyika.
- 1896d. Boulenger, p. 615.
- 1910a. Sternfeld, p. 15.
- 1915a. Boulenger, p. 201.
- 1915e. Boulenger, p. 619.
- 1924b. Loveridge, p. 4.
- 1929a. Werner, p. 50.
- 1933h. Loveridge, p. 232.
- 1933m. Witte, p. 86.
- 1937f. Loveridge, pp. 489, 496.
- 1941a. Uthmüller, p. 40 (as *Glypholicus*).
- 1947e. Laurent, p. 10.
1952. Witte, p. 18.
1953. Witte, p. 164, fig. 42.
1956. Laurent, p. 88, pl. ix, fig. 1.
- 1942b. *Nerophidion hypsirrhinoïdis* Werner, Sitzb. Akad. Wiss. Wien., 133, Abt. 1, p. 54, fig. 7: No locality.
1928. Malcolm Smith, p. 496 (synonymizes with *bicolor*).

³ 50-59 *fade* Laurent (1954b, p. 43).

⁴ 59-71 *fade* Laurent (1954b, p. 43).

Common Name. Tanganyika White-bellied Water-Snake.

Description. Rostral broader than deep, well visible from above; nostril valvular, directed upwards in a semidivided nasal that is sometimes completely divided, rarely entire⁵; internasals narrow anteriorly, as long as, or longer or shorter than, broad, shorter than the prefrontals; prefrontals moderate; frontal $1\frac{1}{4}$ (usually $1\frac{1}{2}$) to 2⁶ times as long as broad, rarely⁷ as long as its distance from the end of the snout, usually as long as its distance from the rostral, much shorter than the parietals; loreal longer than deep, in contact with, or separate from, the first labial, sometimes by the presence of a small scale⁸; eye small. pupil usually round, sometimes subelliptic⁹; preocular 1 (on both sides of all 111 snakes); postoculars 2 (110 ex.), very rarely 1 (M.C.Z. 54936); temporals 1+2 (both sides of 103 ex.), rarely 1+1 (on one side only of M.C.Z. 54886) or 1+3 (M.C.Z. 54916, and on one side only of 6 others); lateral head shields separated by a deep groove from the upper labials; upper labials 7, 8 (eighth usually posterior to the gape) or 9 (left side of M.C.Z. 54879), the fourth, rarely fourth and fifth (M.C.Z. 54837, 54934, etc.) entering the orbit (67 ex.) or separated from it (at least on one side) by 1 or 2 minute suboculars, or by a subocular and an extension of the lower postocular (left side of M.C.Z. 54879), or by an extension of the preocular contacting the lower postocular (right side of M.C.Z. 54857); lower labials 8 or 9 (ninth usually posterior to the gape), first 4 (first 3 only on left side of M.C.Z. 54861 and 54921; or first 5 in M.C.Z. 54935 and on one side only in M.C.Z. 54921 and 54942) in contact with the anterior sublinguals, which are much longer than the posterior. Midbody scale-rows¹⁰ 23-25 (23 in 109 snakes; 24 in 3, viz. M.C.Z. 54908 and 54940-1; 25 in 2, viz. M.C.Z. 54853 (♂)

⁵ Entire in M.C.Z. 54851, 54919, or on left side only of 54852.

⁶ Twice in M.C.Z. 54897.

⁷ As long as its distance in M.C.Z. 26929, 54858, 54871.

⁸ Small scale given off by 1st labial in M.C.Z. 30076, 54869, etc. Small scale given off by 2nd labial in M.C.Z. 54855, 54881, etc. Second labial transversely divided in M.C.Z. 54853, 54857, etc.

⁹ Subelliptic in M.C.Z. 30076, 54859, 54916, and on left of 54941.

¹⁰ 19, given by Boulenger (1915c, p. 619), due to inclusion of *ichytii*; 21, stated in the original description, amended to 23 by Boulenger.

and 54924 (♀)); ventrals 152-166¹¹ (♂♂ 154-164; ♀♀ 152-166); anal entire; subcaudals¹² 52-71 (♀♀ 52-59; ♂♂ 63-71) pairs.

Color. Above, gray or plumbeous, rarely black, uniform except for the two or three outermost rows of scales which are white. Below, throat and belly white, uniform or occasionally some dusky flecking on the anterior third; tail white, sometimes uniform in young but usually with a dusky longitudinal line along the median sutures of the subcaudals.

Size. Largest ♂ (M.C.Z. 54854), 563 (420 + 143) mm.; largest ♀ (M.C.Z. 54902), 778 (615 + 163) mm.; smallest ♂ (M.C.Z. 54856), 227 (175 + 52) mm.; smallest ♀ (M.C.Z. 54852), 235 (188 + 47) mm. All from Kigoma, Tanganyika Territory.

Sexual dimorphism. This is reflected by their respective tail lengths, that of 52 ♂♂ being included in total length 3.64 to 4.42 times, with an average of 3.89; in 49 ♀♀ the tail was included in total length 4.32 to 5.06, with an average of 4.66. For the purpose of these figures snakes with incomplete tails were discarded. The number of subcaudals appear to be an even surer guide to sex, the ♀♀ having from 52 to 59, the ♂♂ from 63 to 71 pairs.

Compare with Laurent's (1956, p. 89) figures expressed as percentages with an average of .255 for ♂♂, .227 for ♀♀. None of his specimens attained the maximum size of those in the Museum of Comparative Zoology.

Breeding. A number of the ♀♀ taken at Kigoma between April 4 and May 4, 1956, are gravid. They have not been critically examined for precise dates and the number of eggs produced at a time.

Diet. I am indebted to Dr. E. Trewavas for determining the species of thirteen fish that Mr. C. J. P. Ionides removed from stomachs of these snakes, viz.

1 *Boulengerochromis microlepis* (Boulenger) from M.C.Z. 54892.

¹¹ 184, as given by Boulenger (1896d, p. 615) presumably a misprint. Battersby has recounted all British Museum *bicolor* and finds them within the range given for M.C.Z. material.

¹² 50 is the lowest given by de Witte (1952, p. 18), and Laurent (1956, p. 89), but the tail tips of all M.C.Z. snakes with less than 52 have been regenerated, though at times this is difficult to see. For ♂♂, Laurent gives 59-71.

- 1 *Haplolarodon tricoli* Poll from M.C.Z. 54947.
 1 *Lamprologus callipterus* Boulenger from M.C.Z. 54908.
 2 *Lamprologus savoyi elongatus* Trewavas & Poll from M.C.Z. 54872 and 54922.
 1 *Lamprologus* sp. from M.C.Z. 54916.
 1 *Limnochromis pfefferi* (Boulenger) from I. 6773.
 4 *Limnotilapia dardenii* (Boulenger) from M.C.Z. 54917, 54933, 54949.
 2 *Stolothrissa tanganyicae* Regan from I. 6773.

Witte (1952, p. 18) also mentions recovering a species of *Limnothrissa*. Except for a couple of cichlids, the stomach contents consisted of elupeids (Laurent:1956).

Habitat. C. J. P. Ionides informs me that he captured these *bicolor* in the lake at night by the light of a pressure lamp, taking the snakes in a hand net about the size of a shrimping net. Laurent (1956) says they are to be found hiding beneath stones on the lakeshore in the vicinity of rivers. He quotes N. Leleup who captured several in the burrows of gerbils (*Tatera* sp.) where they presumably pass the hours of daylight.

Localities. **Tanganyika Territory:** *Karema, Mpanda; Katabi near Bangwe; *Kigoma; Kirando Bay; Lagosa Bay; *Sumbawa. **Northern Rhodesia:** *Mpulungu. **Belgian Congo** — Tanganyika District: Kabimba Bay; Mtoto Bay; Pala Bay; Uvira. **Belgian Urundi:** Makamba (but considered doubtful by the collector); Rumonge.

Range. Lake Tanganyika off the coasts of Tanganyika Territory; Northern Rhodesia; Belgian Congo and Ruanda-Urundi.

LYCODONOMORPHUS SUBTAENIATUS UPEMBAE Laurent

1933m. *Boaedon lineatus* Witte (part: not Duméril & Bibron), p. 86.

1953. Witte, p. 168.

1954b. *Lycodonomorphus subtaeniatus upembae* Laurent, Museo do Dundo, No. 23, p. 41, figs. 5-8; Nyonga, Katanga, Belgian Congo.

Common Name. Eastern Congo White-bellied Water-Snake.

*Description.*¹³ Internasals shorter than the prefrontals; prefrontals moderate; frontal as long as, or shorter than, its distance from the end of the snout, much¹⁴ shorter than the parietals;

¹³ Taken entirely from the original description, where Laurent tabulates the scale-counts for the ♂ and all 21 ♀♀.

preocular 1 (41 sides), rarely 2 (3 sides); postoculars 2 (42 sides), rarely 1 (2 sides); temporals 1 + 2. Midbody scales with apical pits, in 21-23 rows; ventrals 172-188 (δ 172; ♀ 175-188); anal entire; subcaudals 29-40 (♀ 29-34; δ 40).

Color. Above, coloring lighter than in *s. subtaeniatus* and the dark dorsal zone narrower; the two or three outermost rows of scales white.

Size. Only δ (ex Nyonga), 454 (387 + 67) mm.; largest ♀ (ex Nyonga), 831 (739 + 92) mm.

Sexual dimorphism. The solitary δ and one ♀ have 21 midbody scale-rows, the remaining 20 ♀ have 23 rows. The δ has fewer ventrals and more subcaudals than any of the ♀ ; also his tail is longer (δ 15%; ♀ 10 to 12% of total length).

Dentition. Maxillary teeth 19-20.

Localities. **Belgian Congo:** Kina-Mwena; Nyonga near Lake Upemba.

Range. Southeastern Belgian Congo.

LYCODONOMORPHUS SUBTAENIATUS SUBTAENIATUS Laurent

1952b. *Boaedon virgatus* Laurent (not Hallowell), p. 199.

1954b. *Lycodonomorphus subtaeniatus subtaeniatus* Laurent, Museu do Dundo, No. 23, p. 38, figs. 1-4: Keseki, near Kwamouth, Belgian Congo.

Common Names. Western Congo White-bellied Water-Snake; *lubuebwe* or *lunoka* at Dundo, where the same names are applied to *Boaedon fuliginosus*.

*Description.*¹⁵ Rostral broader than deep, just visible from above; nostril directed upwards in a semidivided nasal, internasals shorter than the prefrontals; prefrontals moderate; frontal as long as, or slightly longer or shorter than, its distance from the end of the snout, shorter than the parietals; loreal much longer than deep, separated from the first labial; preocular 1; postoculars 2; temporals 1 + 2; upper labials 8, fourth and fifth entering the orbit; lower labials 8, first 4 in contact with the anterior sublinguals, which are subequal to the posterior. Midbody scales with apical pits, in 21-23 rows (21 in 8 paratypes;

¹⁴ 66-70% in *s. upembae* as against 74-86% in *s. subtaeniatus*.

¹⁵ Based entirely on Laurent's admirable account of 5 ♂ and 8 ♀ as I have seen no material of this recently described species. For further details see Laurent's remarks.

23 in 5); ventrals 175-193 ($\delta \delta$ 175-180; $\text{♀} \text{♀}$ 189-193); anal entire; subcaudals 41-58 ($\text{♀} \text{♀}$ 41-48; $\delta \delta$ 52-58).

Color. Above, dark olive gray; flanks paler, usually bearing a longitudinal lateral band as dark as the dorsum but at times the two shades merge into one another; head with light lines analogous to those of *Boaedon fuliginosus* though not so clear and sometimes indistinct (for a detailed description of these markings consult original paper). Below, whitish, chin shield and first three lower labials marked with white, throat very slightly pigmented; tail with a dusky longitudinal line along the median sutures of the subcaudals.

Size. Largest δ (ex Keseki), 651 (529 + 122) mm.; largest ♀ (ex Dundo), 1009 (872 + 137) mm.

Dentition. Maxillary teeth 19-20.

Hemipenes. Hemipenis not bifurcate, extending to the level of the tenth or eleventh subcaudal; sulcus spermaticus forked near the sixth subcaudal; spines largest in the middle region, weakest at the base and towards the summit; no calyces. Laurent invites attention to the close resemblance of this hemipenis to that of *L. rufulus*, still more so to that of "*Glypholycus bicolor*." He should be consulted for comments on its distinctness from *Lamprophis* and *Boaedon*.

Sexual dimorphism. Laurent points out that 5 of the 8 $\text{♀} \text{♀}$ had 23 midbody scale-rows, whereas all the $\delta \delta$ had 21. Seemingly significant in this species, though not so in *bicolor*, for dimorphism has progressed to the point where $\delta \delta$ have fewer ventrals as well as more subcaudals; in addition, δ tails are always longer ($\delta \delta$ 22-24%; $\text{♀} \text{♀}$ 14-17%).

Diet. A skink (*Mabuya* sp.) was recovered from the stomach of one of these snakes. This is especially interesting in view of the fact that *bicolor* is a fish-eater, while *rufulus* and its race appear to prey chiefly on amphibia.

Localities. **Angola:** Dundo. **Belgian Congo:** Kalina; Keseki near Kwamouth; Kunungu, Lac Leopold II; Leopoldville; Lomami; Luluabourg, Kasai.

Range. Western Angola to western Belgian Congo.

LYCODONOMORPHUS RUFULUS LELEUPI (Laurent)

1950b. *Ablabophis whytei leleupi* Laurent, Revue Zool. Bot. Afr., **43**, p. 351: Kundelungu (Irsae biological station), 1750 metres, northwest Lake Tanganyika, Belgian Congo.

1953. Witte, p. 165; figs. 43 a-c; col. pl. iii, fig. 3; pl. xvi, fig. 2.

1956. *Lycodonomorphus whytei leleupi* Laurent, p. 86.

Common Name. Congo Dark-bellied Water-Snake.

*Description.*¹⁶ Rostral broader than deep, just visible from above; nostril directed upwards, between two nasals; internasals as long as, or longer or shorter than, broad, as long as, or shorter than, the prefrontals; prefrontals moderate; frontal as long as, or longer than, its distance from the end of the snout, shorter than the parietals; loreal longer than deep, well (only barely in 2 snakes) separated from the first labial, enters orbit on left side of one specimen (No. 34-54); preocular 1, rarely 2 (on only 3 out of 40 sides); postoculars 2; temporals 1 + 2 (34 sides) or 1 + 3 (14 sides); upper labials 8, fourth and fifth entering the orbit; lower labials 8, first 4 or 5 (6 sides only) in contact with the anterior sublinguals (anterior and posterior fused on right side of No. 112-122), which are subequal to the posterior. Midbody scale-rows 19 to 21 (19 in only 7 of the 24 snakes known); ventrals 164-174¹⁷ ($\delta \delta$ 165-171; $\text{♀} \text{♀}$ 164-174); anal entire; subcaudals (46-52 in type series, *vide* Laurent, but possibly tips regenerated) 52-67 ($\text{♀} \text{♀}$ 52-61; $\delta \delta$ 65-67).

Color. Above, dark olive brown to glossy black, uniform (including outermost scale-rows). Below, anteriorly whitish to gray; belly of a 230 mm. juvenile is wholly white below, but larger young show progressively encroaching dark patches until the adult condition of a usually black belly sparsely flecked with cream is attained. One subadult from Kabwe River displays a more or less median black streak on its belly, while its tail, like those of the adults, is mostly black.

Size. Largest δ (I.R.B. 41-70), 540 (417 + 123) mm.; largest ♀ (I.R.B. 61), 851 (690 + 161) mm.; smallest ♀ (I.R.B. 4205-06), 230 (182 + 48) mm.

Dentition. Maxillary teeth 24; mandibular 24-27 (Laurent: 1956).

Breeding. On April 3, ova were small in a Lusinga ♀ , but between June 14-18 five adults from the same locality held eggs ranging from 25 to 35 \times 15 mm. Similarly were a gravid ♀

¹⁶ Based on original description; plus 20 specimens, from 3 localities, each of which has been examined by me for every character cited.

¹⁷ 162-174 *vide* Witte (1953 p. 167).

taken at Kabwe between May 21 and 25, and another on June 1 at Pelenge.

Diet. A young frog (*Hemisus* sp.) in one; in others various fish (*Barbus* sp. and *Kneria* sp.) *vide* M. Poll (Laurent:1956).

Localities. **Belgian Congo:** Kabwe River; Kundelungu; Lusinga; Mukelengia River; Pelenge River (for precise position of these places see Witte, 1953, p. 167 and end map).

Range. Montane streams from north end of Lake Tanganyika to region of Lake Upemba, Belgian Congo.

LYCODONOMORPHUS RUFULUS MLANJENSIS Loveridge

1953c. *Lycodonomorphus rufulus mlanjensis* Loveridge, Bull. Mus. Comp. Zool., **110**, p. 253: Ruo River, Mlanje Mountain, Nyasaland.

1953i. Loveridge, p. 476.

Common Names. Mlanje White-bellied Water-Snake (English); *chirumi* (Manganja).

*Description.*¹⁸ Rostral broader than deep, just visible from above; nostril directed upwards, between two nasals; internasals as long as, or longer than, broad, slightly shorter than the prefrontals; prefrontals large, squarish; frontal as long as, or longer than, its distance from the end of the snout, shorter than the parietals; loreal longer than deep, well separated from the first labial; preocular 1; postoculars 2; temporals 1 + 2; upper labials 8, fourth and fifth entering the orbit; lower labials 8, first 4 in contact with the anterior sublinguals, which are subequal to the posterior. Midbody scale-rows 21; ventrals 163-169 (δ δ 163-167; ♀ 169); anal entire; subcaudals 51-71 (♀ 51; δ δ 60-71).

Color. Above, glossy black; upper and lower lips white, the upper heavily infuscated, the lower only anteriorly so; the outermost scale-row and edges of the one next above it, whitish, more or less obscured with dusky infuscations. Below, faintly pinkish white; throat to anus immaculate except for an occasional tiny fleck (on three ventrals of type); tail with a longitudinal line formed of dusky median spots.

Size. Largest δ (M.C.Z. 51050:the type), 735 (550 + 180) mm., only known ♀ (B.M. 24.2.1.27), 780 (642 + 138) mm. The tail being 17% of her total length as against 21-24% for the three males.

¹⁸ Based on 3 ♂ (from Mlanje and Cholo in M.C.Z.) and a ♀ (Zomba in British Museum).

Remarks. *L. r. mlanjeensis* is distinguished from *rufulus* and all its races except *r. leleupi* of the Congo, by possessing 21 mid-body scale-rows. From *r. leleupi* (and *laevissimus*, of which two individuals with 21 scale-rows have been reported), it is readily distinguished by its immaculate white throat and belly. Whether additional Nyasaland material will demonstrate that it should be merged with *r. whytii* remains to be seen.

Diets. A large ranid tadpole was present in the stomach of the type.

Parasites. Nematode worms (*Kalicephalus* sp.; immature *Ascaridae*; also larval Anisakinae, probably *Cleascaris* sp.) were abundant in the type.

Temperament. Even Africans appear to recognize the docility of this species as will be seen from their attitude as described by Loveridge (1953e, p. 255).

Habitat. Apparently hide beneath stones in shallow streams.

Localities. Nyasaland: *Muyenda Stream, an affluent of Nswadzi River, Cholo Mountain; *Ruo River, Mlanje Mountain; *Zomba Mountain.

Range. Montane streams of southern Nyasaland.

LYCODONOMORPHUS RUFULUS WHYTHI (Boulenger)

- 1897c. *Glyphotycus whytii* Boulenger, Proc. Zool. Soc. London, pp. 800, 802, pl. xlvii, fig. 2: Fort Hill, Nyasaland.
 1898. Johnston, p. 361a.
 1915c. Boulenger p. 619.
 1929a. Werner, p. 50.
 1935. *Ablabophis whytii* Cott, p. 965.
 1940. Bogert, p. 18.
 1952. *Ablabophis rufulus whytei* Ionides, in Swynnerton, p. 10.
 1953e. *Lycodonomorphus rufulus whytii* Loveridge, pp. 255, 317.
 1953i. Loveridge, p. 476.
 1955e. Loveridge, p. 182.

Common Name. Whyte's Water-Snake.

*Description.*¹⁹ Rostral broader than deep, just visible from

¹⁹ Based on ♀♀ (from Bungwe; Songea and Fort Hill) and Cott's Charre snake which is too dried and shrivelled to be of much good; however its tail with 37 subcaudals does seem to be intact. Cunha's two snakes from Massangulo, Portuguese Nyasaland, reported as *Ablabophis rufulus*, were actually *Baocdon fuliginosus*.

above; nostril directed upwards, between two nasals; internasals as long as, or longer than, broad, shorter than the prefrontals; prefrontals moderate; frontal as long as, or longer than, its distance from the end of the snout, shorter than the parietals; loreal longer than deep, well separated from the first labial; preoculars 1-2; postoculars 2; temporals 1 + 2; upper labials 8, fourth and fifth entering the orbit (or 9, with fifth and sixth entering on right side of Charre ♀) lower labials 8, first 4 in contact with the anterior sublinguals, which are subequal to the posterior. Midbody scales without apical pits, in 19 rows; ventrals 159-168 (all ♀♀; 172 — not 176 as given by Cott — if Charre snake included); anal entire; subcaudals 46-47 (all ♀♀; 37-47 if Charre snake included).

Color. Above, dark olive to slate gray, uniform, or the outermost scale-row on either side pinkish or yellowish white. Below, pinkish or yellowish white, uniform (Fort Hill), or a few dusky patches down the middle of the venter (Rungwe), or a dusky median line commencing on the throat, rapidly broadening to occupy all but the lateral edges of the ventrals and subcaudals.

Size. Largest ♀ (M.C.Z. 52637), 709 (590 + 119) mm. from Songea; Rungwe ♀ (A.M.N.H. 38984), 625 (519 + 106) mm.; Fort Hill type ♀ (Brit. Mus.), 565 (465 + 100) mm.

Dentition. Maxillary teeth apparently 24 on one side of damaged Rungwe snake (*vide* Bogert).

Sexual dimorphism. Tails of these 3 ♀♀ are from 15-17% of total lengths.

Diet. Hind feet of an amphibian in stomach of Rungwe snake (Bogert); hind limbs of a *Rana fuscigula* in the Songwe specimen.

Parasites. The entire digestive tract of the Songwe snake was riddled with worms. These have been identified by J. T. Lueker as a ♀ Oxyuroidea besides both sexes of a *Kalicephalus*, probably *K. micrurus*. In the mesentery were two ♂ *Dracunculus* sp. and numerous encapsuled larvae of one of the Physalopteridae.

Localities. **Tanganyika Territory:** Rungwe Mountain; *Songea boma. **Nyasaland:** *Fort Hill. **Mozambique:** *Charre (if referable to this race).

Range. Southern Tanganyika Territory and northern Nyasaland, south (? down eastern side of Lake Nyasa) to the Zambezi at Charre, Mozambique.

LYCODONOMORPHUS RUFULUS RUFULUS (Lichtenstein)

1823. *Coluber rufulus* Lichtenstein, Verz. Dubl. Zool. Mus. Berlin, p. 105:
South Africa.
1826. Fitzinger, p. 57.
1831. *Coronella leucopilus* A. Smith, S. African Quart. Jour. (1), No. 5,
p. 17:
1837. *Coronella rufula* Schlegel (part), p. 74, pl. ii, figs. 18-19.
1843. Traill, p. 136 (as in Schlegel, subcaudal counts in error).
1843. *Lycodonomorphus rufula* Fitzinger, p. 27.
1861. Fitzinger, p. 408.
1847. *Lamprophis rufulus* A. Smith, pl. lviii.
- 1863a. Jan, p. 285.
1866. Jan, pl. iv, fig. 1.
- 1884a. Müller, p. 284.
- 1887b. Boettger (part), p. 161 (omit Clarkebury).
- 1887h. Boulenger, p. 177.
1889. Boettger, pp. 290, 294.
1890. Müller, p. 693.
- 1891a. Matschie, p. 609.
- 1892a. Boulenger, p. 176.
- 1854a. *Ablabes rufula* Duméril & Bibron, p. 308.
- 1858c. Günther, p. 30.
- 1867a. Steindachner, p. 62.
- 1893b. *Ablabophis rufulus* Boulenger, p. 318.
1898. Boettger, p. 35.
1898. Werner, p. 143.
1898. Selater, p. 98.
1902. Lampe & Lindholm, p. 17.
- 1905h. Boulenger, p. 255.
- 1907j. Boulenger, p. 486.
- 1907c. Roux, p. 733.
- 1908b. Boulenger, p. 228.
1908. Gough (part), p. 21.
1908. Odbner, p. 5.
- 1910b. Boulenger, p. 503.
- 1910a. Hewitt, p. 57.
- 1910b. Sternfeld, p. 15.
- 1910a. Werner, p. 355.
1912. FitzSimons, F.W., pp. 82, 91.
1912. Hewitt, p. 267.
1913. Hewitt & Power, p. 161.
1916. Andersson, p. 40.

- 1925b. Flower, p. 966.
 1929. Flower, p. 181.
 1929. Rose, pp. 146, 157, figs. 91-94, 102.
 1929a. Werner, p. 48.
 1931. Power, pp. 43, 48.
 1935. Power, p. 333.
 1937e. Hewitt, p. 57, pl. xviii.
 1940. Bogert, p. 18.
 1946a. FitzSimons, V.F., p. 355.
 1950. Fantham & Porter, pp. 601, 603.
 1950. Rose, pp. 225, 269, 272, 320, figs. 140-143, 164.²⁰

Further citations of "*rufulus*" will be found under *laevissimus* and *Boaedon f. fuliginosus*.

Common Names. Brown Water-Snake (Hewitt). It has also been called Olive-brown Water-Snake by F. W. FitzSimons, South African Rufous Snake by Flower, Black Water Snake by Rose.

Description. Rostral broader than deep, just visible from above; nostril directed upwards, between two nasals; internasals as long as, or longer than, broad, much shorter than the prefrontals; prefrontals moderate; frontal $1\frac{1}{2}$ to $1\frac{2}{3}$ times as long as broad, as long as its distance from the end of the snout, shorter than the parietals; loreal longer than deep, well separated from the first labial; preocular 1, rarely 2; postoculars 2; temporals 1 + 2; upper labials 8, fourth and fifth entering the orbit; lower labials 8, first four in contact with the anterior sublinguals, which are subequal to the posterior. Mid-body scales with or without apical pits, in 19 rows; ventrals 160-178 ($\delta \delta$ 162-175; $\text{♀} \text{♀}$ 160-178); anal entire; subcaudals 54-78²¹ ($\text{♀} \text{♀}$ 54-79; $\delta \delta$ 72-78).

Color. Above, dark olive brown to glossy black, uniform, or the outermost scale-row on either side slightly yellowish white;

²⁰ Largely a reprint of 1929, and repeated in 1955, pp. 28, 90, 178 as *Lycodonomorphus rufulus*.

²¹ 84 *vide* Boettger (1889).

upper and lower lips (light pink in life) lemon to ochre or yellowish white, immaculate. Eyes dark brown flecked with reddish brown, the pupil edged with reddish brown. In young snakes the back and sides are a deep yellowish brown, the underside a paler immaculate yellow than in the adults.

Below, anteriorly yellowish white becoming brighter yellow towards the anus; tail yellow, usually immaculate, occasionally with a dusky median line (*vide* Günther: 1858; Boettger: 1889; Müller: 1890b; their specimens coming from Natal; Botschabelo near Middleburg, Transvaal; and Harrismith, Cape Province, respectively), or each scale dark-edged.

Size. Largest ♂ (A.M.N.H. 60113), 605 (445 + 160) mm.; largest ♀ (M.C.Z. 21306), 827 (635 + 192) mm.; smallest, a ♂ (M.C.Z. 55143), 269 (205 + 64) mm.

Remarks. The type of *rufulus* is presumably still in the Berlin Museum, while that of *leucophilus* is unknown. Rochebrune's (1884a, p. 158) listing of this species from Senegal is omitted as obviously erroneous. The two snakes from Massangulo, Portuguese Nyasaland, referred to *rufulus* by Cunha (1935, p. 5; 1937, p. 1779) were actually based on *Boaedon l. lineatus*, so Dr. A. A. Themido tells me. The scale counts furnished by Cunha are not those of his specimens but were taken from Boulenger's (1893b, p. 318) catalogue.

Dentition. Maxillary teeth 25 on right rami of both Merbank snakes, the six foremost ones slightly less recurved than those following; posterior teeth somewhat smaller (Bogert).

Hemipenes. Hemipenis bifurcate at extreme end, extends to the level of the tenth subcaudal; sulcus spermaticus forked at the sixth subcaudal; spines feebly enlarged at the base, arranged in diagonal rows or, towards distal end, in chevrons, those on the terminus of each lobe decreasing in size.

Sexual dimorphism. Verified subcaudal counts for ♀ ♀ is 54-73; in ♂ ♂ 72-78 (possibly to 84 if Boettger's Botschabelo snake was a ♂ and the count correct). Intact tails of 9 ♀ ♀ are 19-23% of total length; those of 3 ♂ ♂ are 26-28% of total length.

Breeding. In December about 6 (photo shows 9) eggs are laid, from which emerge six-inch young (Rose).

Longevity. Four years, 3 months, 10 days, in London Zoo (Flower).

Diet. They have been seen to chase frogs into water and, diving in after them, seize the hapless amphibian on the bottom (F. W. FitzSimons). *Xenopus l. laevis* was found in one's gullet (Werner:1898), and *Rana g. rhodesiana* in a stomach (V. FitzSimons:1939b). Frogs are said to be invariably swallowed head first, and photographs of one being engorged, with subsequent x-ray of it in the snake's stomach, are furnished by Rose (1929: figs. 91-94). On exhibition in the Transvaal Museum is a *r. rufulus* with the head of a frog (*Rana f. fuscigula*) in its greatly distended mouth. V. FitzSimons told me that this snake, rather than relinquish its captive, had allowed itself to be anesthetized in this position. Another exhibit was of a *r. rufulus* that had died while attempting to swallow a fish that was too large for it (Loveridge). In captivity some fed on barbel, carp and tinned sardines (Fantham & Porter:1950); other captive *r. rufulus* seized live fish which they held by as many as five coils (F. W. FitzSimons). They will attack and kill by constriction other snakes that may be confined in the same vivarium (C. J. French in Hewitt).

Following the sweeping statement (1950; p. 269) that this species subsists "mainly, if not entirely, on frogs," Rose (1955, p. 90) goes to the other extreme, adding that it consumes tadpoles in large quantities and, though in his experience "it will not touch" toads, "it will readily eat mice and geckos." On what evidence this last surprising statement is based, is not mentioned.

Parasites. Fantham and Porter (1950) found nematodes (*Ophidascaris mombasica*) in the small intestine, from whose lower reaches and cloaca they described three new protozoa (*Balantidium serpentis*; *Chilodon cyprini serpentis*; *Nyctotherus ophidiae*). Hemogregarines were present in the blood.

Habitat. Restricted by their diet to marshy ground or the vicinity of swamps, pools, and rivers. In clear mountain streams

they may be seen lying on the sandy or gravelly bottom where, if disturbed, they seek shelter beneath stones by forcing their way through the soft sand or gravel. By day they may be found under stones in damp spots (Hewitt) or hiding beneath rotten logs lying on muddy ground beside a stream (V. FitzSimons). At night some were captured in partially dried stream beds where they were apparently engaged in hunting frogs (Power), but in districts such as Kimberly that are subject to drought, the Brown Water-Snake is not to be found (Hewitt & Power).

Localities. **Southern Rhodesia:** Matabeleland (1893); Vumba Mtn.* (M.C.Z.). **Bechuanaland. Transvaal:** Bethel*; Boekenhoutkloof*; Botschabelo; Brits*; Broederstroom*; Bronkhorstspruit*; Driefontein; Entabeni*; Haenertsburg*; Irene*; Johannesburg*; Lake Fundusi*; Lydenburg*; Majielsberg; Mariepokop*; Middleburg*; Modderfontein*; Mphome; Pietersburg; Pinedene*; Potchefstroom*; Pretoria* (M.C.Z.); Rustenberg*; Tzaneen*; Wakkerstroom*; Waterberg District*; Watervaalboven*; White River*; Witbank*; Woodbush*. **Natal:** Durban; Giants Castle*; Merebank; Port Natal; Sibudeni; Vryheid*; Zululand. **Orange Free State:** Modder River*; Parys*; Tweespruit*. **Basutoland. Cape Province:** Albany District*; Algoa Bay*; Avontuur*; Burghersdorp; Cape Flats; Clanwilliam; De Wet*; George; Gnadenthal (Jan, 1863); Grahamstown; Grootvadersbosch; Harrismith; Kingwilliamstown; Knysna; Linokana; Pondoland; Port Elizabeth; Port St. Johns (M.C.Z.); Prince Albert; Robben Island; Schoester's Drift (M.C.Z.); Somerset Strand; Stellenbosch; Table Mountain; Touw's River; Worcester*. **Southwest Africa:** Damaraland (Palgrave coll. in S.A.M.).

Range. Africa south of the Zambezi River (in well-watered regions).

LYCODONOMORPHUS LAEVISSIMUS (Günther)

- 1862b. *Natrix laevissima* Günther, Ann. Mag. Nat. Hist., (3) 9, p. 124, pl. ix, fig. 4: "probably from East Indies" (error).
 1937e. Hewitt, p. 58.
 1937b. Mertens, p. 12.

* Specimens in the Transvaal Museum whose identifications have been checked for the purpose of this revision by Dr. V. FitzSimons.

1863. *Neustrophis laevis* Günther, p. 16, footnote.
 1887b. *Lamprophis rufulus* Boettger (part: not Lichtenstein), p. 161.
 1893b. *Tropidonotus laevis* Boulenger, p. 226.
 1908b. Boulenger, p. 228.
 1909f. Boulenger, p. 944.
 1910b. Boulenger, p. 503.
 1912. FitzSimons, F.W., p. 82.
 1912. Hewitt, p. 267.
 1925. Werner, p. 49.
 1929a. Werner, p. 24.
 1898. *Grayia lubrica* Selater, Ann. S. African Mus., 1, pp. 99, 109, pl. —, fig. 1: Tsomo, Transkei District, Cape Province.
 1908. *Ablabophis rufulus* Gough (part: not Lichtenstein), p. 21.
 1923c. *Hydrablabe melanogaster* Werner, Ann. Naturhist. Mus. Wien, 36, p. 161: "Tenimber Island," Dutch East Indies (error).
 1940. *Neustrophis laevis* Bogert, pp. 5, 34.
 1946b. FitzSimons, V.F., p. 379.
 1950. Rose, p. 272.
 1955. Rose, p. 92.

Common Names. Dusky-bellied Water-Snake (which I suggest as being more diagnostic than either "Watermeyer's Black Snake," proposed by F. W. FitzSimons, or "Black Water Snake," put forward by Hewitt); *ixilenzi* (Kaffir:Hewitt).

Description. Rostral broader than deep, just visible from above; nostril directed upwards, between two nasals; internasals longer than broad, shorter or longer than the prefrontals; prefrontals small, sometimes pointed anteriorly; frontal $1\frac{2}{3}$ to 2 times as long as broad, shorter than, as long as, or longer than, its distance from the end of the snout, shorter than the parietals; loreal longer than deep, in contact with the first labial or, rarely, separated from it by a granule; preocular 1; postoculars 2; temporals 1 + 2; upper labials 8, fourth and fifth entering the orbit; lower labials 8, first 4 in contact with the anterior sublinguals, which are subequal to the posterior. Midbody scales without apical pits, in 19 rows, exceptionally 21;^{22, 23} ventrals 172-183 ($\delta \delta$ 172-181; $\text{♀} \text{♀}$ 172-183); anal entire, rarely divided²²; subcaudals 57-78 or 81.²³

²² Only in a Port Elizabeth snake recorded by Mertens (1937b).

²³ Only in a Lothair snake which FitzSimons (1946b) thinks may be subspecifically distinct.

Color. Above, grayish olive to glossy black; from the eye to above the gape there is usually a more or less well-defined yellowish white line; upper and lower labials and two outermost scale-rows on either side yellowish white, generally spotted or blotched with grayish black.

Below, yellowish white with a narrow, dusky median line or series of spots extending from the throat to end of tail, occasionally broadening posteriorly even to the exclusion of the yellowish white.

Size. Total length of holotype ♂ (Brit. Mus.), 850 (650 + 200) mm., largest ♀ (A.M.N.H. 18223), 1100 (875 + 225) mm., while a ♀ without precise locality measured (*vide* Werner:1925), 1050 (850 + 200) mm.

Remarks. The unlocalized type is in the British Museum; the type of *G. lubrica*, collected by M. Watermeyer, in the South African Museum, the type of *H. melanogaster* in Vienna. It was synonymized by Werner himself, who explained the wrong locality as due to the practice of attaching the data-bearing label to the easily transposed stoppers of the museum jars.

Habits. Almost entirely aquatic.

Habitat. Fairly common in streams and reservoirs around Grahamstown (Hewitt) where, as at Kingwilliamstown, *L. r. rufulus* also occurs.

Localities. **Transvaal:** Ermelo District: Lothair (but 21 scale-rows). **Natal. Cape Province:** Alicedale; *Blaauwkrantz; Bushmans River; *Clarkebury; Emfundisweni; *Grahamstown; Kingwilliamstown; Pirie; Tsomo, Transkei District.

Range. Transvaal south to Natal, west to eastern Cape Province (i.e. west to Graaf Reinet and south to Port Elizabeth).

Genus NATRICITERES Loveridge²⁴

1953e. *Natriciteres* Loveridge, Bull. Mus. Comp. Zool., **110**, p. 248. Type by original designation: *Coronella olivacea* Peters.

Definition. Maxillary teeth 23-25, the anterior ones subequal, the last 3 or 4 sharply increasing in size; mandibular teeth

²⁴ The eight generic names that have been misapplied to snakes of this genus will be found listed under the original (1953e) description of *Natriciteres* (i.e. ♀ *Natrix* + *teres* = smooth).

slightly increasing in size towards the middle of the jaw, decreasing posteriorly. Head slightly distinct from neck; eye moderate, with round pupil; nostril more or less directed upwards, in a divided nasal; a loreal; preoculars 1-2; lateral head shields not separated by a groove from the upper labials.

Body cylindrical; scales smooth, without apical pits, in 15-19 rows; ventrals rounded; anal entire or divided. Tail moderate, tapering; subcaudals paired. Hemipenis of male basally bifid, exhibiting a short secondary lobe; sulcus spermaticus not forked. Hypapophyses present posteriorly in the vertebral column.

Additional characters common to the five members of the genus are: Rostral broader than deep, visible from above; nostril between two nasals or separated from the posterior one by a narrow rim; internasals more or less narrowly truncate anteriorly, about as long as broad, slightly shorter than, or as long as, the prefrontals; frontal (in the middle) $1\frac{2}{3}$ to 2 ($2\frac{1}{3}$ occasionally in *o. olivacea*) times as long as broad, longer than its distance from the end of the snout, shorter than the parietals; loreal about as long as deep.

Range. Africa south of 15° N., i.e. Sudan east to Somalia, south to Southern Rhodesia, northwest through Belgian Congo to French Guinea.

Key to the Species of Natriciteres

- | | |
|---|---|
| 1. Anal divided ²⁵ | 2 |
| Anal entire | 5 |
| | |
| 2. Midbody scale-rows 19 (rarely 17 or 18); range: swampy lowlands of Sudan, east to southern Somalia, south to Southern Rhodesia, ²⁶ northwest through the Belgian Congo to French Guinea | |
| <i>o. olivacea</i> (p. 29) | |
| Midbody scale-rows 17 or less (rarely 18 or 19) | 3 |
| | |
| 3. Midbody scale-rows 17 (very rarely 15, 18 or 19); range: montane marshes and forest fringes of East Africa from Tanganyika Territory south through Mozambique, Nyasaland and Northern Rhodesia | |

²⁵ Entire in one of two juvenile *o. olivacea* from Yakoma-Abiras in the Paris Museum (*vide* Guibé).

²⁶ On the basis of the solitary Salisbury record of 1898.

to Southern Rhodesia and Angola *o. uluguruensis* (p. 37)
 Midbody scale-rows 15 (or at times 17 in *pembana*) 4

4. Subcaudals 49-63; range: an insular form found only on Pemba Island, north of Zanzibar Island *o. pembana* (p. 42)
 Subcaudals 63-78; range: French Cameroon west to French Guinea ...
 *variegata* (p. 43)
5. Subcaudals 75-95; midbody scale-rows invariably 17 correlated with an entire anal; range: Belgian Congo northwest to French Guinea
 *fuliginoides* (p. 46)

It will be noted that the ranges of these last two species are coextensive and both kinds may occur in the same locality. In color and pattern they are indistinguishable, a conspicuous light nuchal collar being present in both, yet they appear to be distinct species.

In the following tabulation parentheses have been used to indicate unusual variations detected during the examination of over 200 snakes.

In the following tables the forms are arranged according to their maximum size, which exhibits some correlation with an increase in the number of ventrals and subcaudals. Many lower subcaudal counts, including some of my own, have appeared in the literature. On re-examination, however, these are found to have been based on individuals with abbreviated tails, *whose pointed terminal tips have been regenerated*. When lost early in life these are sometimes so astonishingly like the original as to have misled distinguished herpetologists into describing as new species examples of such short-tailed snakes. In the genus *Natriciteres* detection is complicated by the high percentage — varying from locality to locality, but possibly 30% to 50% — of adult snakes that have lost their tail tips to predators, as can be seen by comparison with the tails of young specimens.

STATISTICAL DATA FOR THE SPECIES OF
NATRICITERES: AMENDED TO 1957.

Species or race	Pre-ocular	Post-oculars	Temporals	Upper Labials	Lower Labials	Midbody Scale-rows
<i>o. pembana</i>	1-2	3	1+2	8	8	15(17)
<i>variegata</i>	1-2	(2)3	(1+1)1+2	(7)8(9)	8-9	(13)15(17)
<i>o. uluguruensis</i>	1(2)	(2)3	(1+1)1+2(2+1)	8(9)	8-10	(15)17(19)
<i>o. olivacea</i>	1(2)	(1)(2)3	(1+1)1+2(1+3)	(7)8(9)	8-10	(17-18)19
<i>fuliginoides</i>	1-2	(2)3	(1+1)1+2(0+2)	(7)8	8-10	17

Species or race	Ventrals	Anals	Subcaudals	Maximum length in	
				♂	♀
<i>o. pembana</i>	123-128	2	49-63	200+78 mm.	210+75 mm.
<i>variegata</i>	124-137	2	63-78	265+135 mm.	240+101 mm.
<i>o. uluguruensis</i>	125-144	2	62-84	300+130 mm.	350+140 mm.
<i>o. olivacea</i>	128-149	2	27.51-87	332+132 mm.	460+144 ²⁸ mm.
<i>fuliginoides</i>	122-137	1	75-95	370+186 ²⁸ mm.	310+ ? mm.

²⁷ 51 in U.S.N.M. 49023 whose tail-tip may possibly be regenerated; 54, recorded by Fischer (1884b) for a Masaland snake, is presumably in the same category; this leaves 57 as the lowest authentic count.

²⁸ In neither of these instances is the tail measurement that of the snake whose body length is given as the maximum for the form.

NATRICITERES OLIVACEA OLIVACEA (Peters)

- 1854b. *Coronella olivacea* Peters, Monatsb. Akad. Wiss. Berlin, p. 622: Tete, Zambezi River, Mozambique.
1855. Peters, p. 52.
- 1858c. Günther, p. 39.
- 1866a. Bocage, p. 47.
- 1866b. Bocage, p. 66.
- 1882a. Bocage, p. 288.
- 1882a. Peters (part), p. 114, pl. xvii, fig. 1 (omit Angola & Zanzibar coast).
- 1882b. Müller, p. 168.
- 1887b. Mocquard, p. 66.
1888. Mocquard, p. 128.
1889. Pfeffer, p. 9.
- 1893b. Boettger, p. 123.
1893. Pfeffer, p. 79.
1899. Mocquard, p. 219.
- 1908b. Mocquard, p. 558.
- 1860a. *Coronella (Meizodon) dumerilii* Günther, Proc. Zool. Soc. London, p. 429, fig. —: "Sierra Leone" i.e. Gold Coast, *vide* Boulenger.
- 1863a. *Enicognathus punctatostratus* Jan, Arch. Zool. Anat. Fisiol., **2**, p. 278: No locality (Type in Hamburg Museum).
1866. Jan, pl. iv, fig. 4.
- 1877c. *Coronella (Mizodon) olivacea* Peters, p. 614.
- 1888a. Boettger, p. 84.
- 1877c. *Neusterophis atratus* Peters, Monatsb. Akad. Wiss. Berlin, p. 614, pl. —, fig. 1: Chinchoxo, Cabinda.
- 1888a. Günther, p. 51.
- 1884a. *Zacholus olivaceus* Rochebrune, p. 156 (ignored in this revision).
- 1884a. *Meizodon dumerilii* Rochebrune, p. 158 (ignored in this revision).
1886. *Grayia Giardi* Dollo, Bull. Mus. Roy. Hist. Nat. Belgique, **4**, p. 158, figs. 1-2: Lake Tanganyika region, Belgian Congo.
- 1894a. Boulenger, p. 288.
- 1910a. Sternfeld, p. 23.
- 1893b. *Tropidonotus olivaceus* Boulenger, p. 227.
- 1896d. Boulenger, p. 604.
- 1896e. Boulenger, p. 216.
1896. Peraea, p. 2.
1896. Tornier, p. 67.
- 1897b. Boulenger, p. 278.
- 1897e. Boulenger, p. 800.
- 1897g. Boulenger, p. 279.

1897. Tornier, p. 67 (reprint of 1896 book).
1897b. Tornier, p. 65.
1898. Boettger, p. 22.
1898. Johnston, p. 361a (not in 1897 ed.).
1898. Selater, p. 98.
1898. Tornier, p. 292.
1900b. Boulenger, p. 451.
1900. Flower, p. 968.
1902d. Boulenger, p. 446.
1905e. Boulenger, p. 112.
1907a. Boulenger, p. 10.
1907a. Roux, p. 76.
1908a. Sternfeld, p. 404.
1908b. Sternfeld, pp. 211, 228.
1908e. Sternfeld, p. 243.
1908. Werner (1907), p. 1866.
1908a. Werner, p. 170.
1909b. Boulenger, p. 303.
1909. Peracca, p. 172.
1909a. Sternfeld, p. 11.
1909b. Sternfeld, p. 10.
1910b. Boulenger, p. 503.
1910. Peracca, p. 3.
1910. Roux, p. 98.
1910a. Sternfeld (part), p. 14, fig. 12.
1911. Lampe, p. 187.
1911. Sternfeld & Nieden, p. 385.
1912. Hobley, p. 47.
1912. FitzSimons, F. W., p. 82.
1912e. Sternfeld, p. 265.
1913. Boettger, pp. 345, 347, 353.
1915a. Boulenger, p. 201.
1915e. Boulenger, p. 619.
1915d. Boulenger, p. 645.
1916f. Chabanaud, p. 368.
1916a. Loveridge, pp. 77, 82.
1917b. Chabanaud, p. 10.
1917. Sternfeld, p. 460.
1918a. Loveridge, p. 334.
1919a. Boulenger, p. 276.
1919g. Boulenger, p. 19.

- 1919d. Chabanaud, p. 567.
1921a. Angel, p. 42.
1922. Aylmer, p. 15.
1923e. Loveridge (part), p. 876.
1924b. Loveridge, p. 4.
1927d. Witte, p. 321.
1929a. Werner, pp. 15, 24.
1933. Schouteden, p. 236.
1933j. Witte, p. 122.
1933m. Witte, p. 85.
1934a. Schwetz, p. 382.
1937b. Monard, p. 113.
1894e. *Coronella olivacea* var. *dumerilii* Günther, p. 87.
1897. Johnston, p. 362.
1898. Johnston, p. 361a (reprint of 1897 book).
1895a. *Mizodon olivaceus* Boeage, p. 74.
1896a. Bocage, p. 91.
1897b. Mocquard, p. 8.
1923. *Natrix olivacea* Schmidt (as *olivaceous*), p. 58.
1925a. Loveridge (part), p. 71.
1928e. Barbour & Loveridge (part), p. 109.
1928. Cott, p. 953.
1928g. Loveridge (part), p. 34.
1928j. Loveridge (part), p. 71.
1929. Flower, p. 174.
1929h. Loveridge (part), p. 19.
1929. Worthington, p. 124.
1933f. Angel, p. 72, figs. 25-25a.
1933h. Loveridge (part), p. 231.
1934c. Mertens, pp. 78, 171.
1934. Pitman, p. 293.
1935a. Corkill, p. 14.
1935. Cott, p. 964.
1941. Moreau & Pakenham, p. 108.
1943. Scortecci, p. 270.
1951. Monard, p. 147.
1936h. *Natrix olivacea olivacea* Loveridge, p. 21.
1936j. Loveridge, p. 236.
1936. Pitman, p. 224, pl. iii, fig. 4; pl. B, fig. 2.
1937e. Loveridge, p. 270.
1937f. Loveridge, pp. 489, 493, 496.
1938b. Mertens, p. 46.

- 1938a. Pitman, pp. 301, 326.
 1938b. Pitman (repaged reprint embracing 1936 and 1938a in book form).
 1938. Uthmüller, p. 42.
 1939a. Scortecchi, p. 270.
 1941a. Uthmüller, p. 26.
 1941b. Uthmüller, p. 230.
 1947. Pakenham, p. 138.
 1940. *Neusterophis olivaceus olivaceus* Bogert, p. 35.
 1941. Witte, p. 173.
 1942e. Loveridge, p. 261.
 1942. Moreau & Pakenham, p. 62.
 1949a. Parker, p. 28.
 1950f. Laurent, p. 128.
 1953. Witte, p. 160, fig. 40.
 1945. *Neusterophis olivaceus* Leeson, p. 3.
 1950. Ionides, p. 100.
 1950. Leeson, pp. ix, 36, 38, 66, 136.
 1950. Rose, pp. 272, 320.
 1950a. Villiers, p. 39.
 1950b. Villiers, p. 69, figs. 71-72.
 1954. Dekayser & Villiers, p. 963.
 1955. Rose, pp. 92, 178, fig. 1.
 1953e. *Natriciteres olivacca olivacca* Loveridge, pp. 251, 317.
 1954b. Laurent, p. 44 (as *olivaceus*).
 1955. Witte, p. 214.
 1956. Laurent, p. 132, fig. 21.
 1954d. *Natriciteres olivaceus* Laurent, p. 305.

Further references to "*olivacca*" or "*olivaceus*" will be found under its subspecies *uluguruensis* and *pembana*.

Common Names. Olive Marsh-Snake (preferred A. L.), many names have been proposed beginning with Black-backed Grass-Snake (Flower, 1929), Grass-Snake; Olive Grass-Snake; Olive Water-Snake; Black-backed Water-Snake; and Common Water-Snake; *inkubayoka* (Nyarwanda: *vide* Laurent).

Description. Preoculars 1, rarely 2; postoculars 3, rarely 1 or 2; temporals 1 + 2, rarely 1 + 1 or 1 + 3; upper labials 8, rarely 7 or 9, the fourth and fifth, rarely the third, fourth and fifth, or fourth, fifth and sixth, or fifth and sixth, entering the orbit; lower labials 8-10, the first four, five, or six in contact with the

anterior sublinguals, which are much shorter than the posterior. Midbody scale-rows 19, rarely 18 or 17; ventrals 128-149 (130-147 in M.C.Z.); anal divided; subcaudals (? 51, 52) 57-87.

For characters common to all species, and tabulated data, see pp. 25-26, 28.

Color. Above, olive brown, brown, gray, or bluish black; upper lip yellowish, the labial sutures black; juvenile specimens sometimes exhibit a pale spot on the parietals; usually a more or less distinct darker, sometimes chocolate, vertebral band four or five scales in width, bordered on either side by a narrow buffy one or, more rarely, by a series of light dashes or dots; the coloring of the flanks impinging as olive, gray, pale blue, red, or bright mauve on the ends of the ventrals, which are otherwise yellowish (sometimes orange in life) occasionally edged with black.

Pitman (1936, p. 225) comments on the handsome coloring of many of the snakes taken around Lakes Bunyonyi (6,400 feet). Chahafi and Mutanda (6,000 feet), whose black-edged, dark brown, vertebral band is flanked by narrower bands of bright chestnut with paler edges; beyond this again is a narrow dark line below which is a broad band of mauve or reddish chestnut occupying most of the lower flank. His book should be consulted for further notes on coloration. The wide range of ventral coloring is quite irrespective of sex.

Laurent (1956, p. 134) mentions a red-eyed albino juvenile from Bukavu; also a Kitutu specimen that is black below.

Size. Length of ♂ (M.C.Z. 40329), 464 (332 + 132) mm., of largest perfect ♀ (M.C.Z. 40334), 553 (409 + 144) mm., both from Ngatana, but surpassed in head and body length by a ♀ (M.C.Z. 40317) of 585+ (460 + 125+) mm. with regenerated tail-tip.

Remarks. The type of *Coronella dumerilii* Günther (1860) was said to have a single anal and to have come from Sierra Leone. I mention this as *N. fuliginoides* has a single anal and does occur in Sierra Leone. However, Boulenger (1893, pp. 227-228) synonymized *dumerilii* with *olivacea* (which has a divided anal) and changed its locale to Gold Coast, donor H. H. Evans. Only

one specimen is listed. J. C. Battersby informs me (29.v.50) that it was one of five snakes received from H. Evans of the Gold Coast (now Ghana).

Sternfeld's (1917) record of seven *olivacea* from Duma with entire anals is surely a lapsus, for in both ventral and midbody scale-rows they agree with *olivacea*. The scale-rows on an Albertville snake (M.C.Z. 30074) reported as 17 by me (1933h), are actually 19 at mathematical midbody. The four Magrotto Mountain snakes with 19 rows brought to me (1942e) by natives, may well have come from the cultivated areas lower down the mountain as the half-dozen snakes I personally captured at the forest-edge all have 17 rows.

Sexual dimorphism. This is so slight as to be negligible, for example in M. C. Z. material examined in 1950:

ventrals of	26 ♂♂	ranged from	130-141,	giving an average of	134.9
"	38 ♀♀	" "	131-147,	" " " "	137.7
subcaudals of	17 ♂♂	" "	57-80,	" " " "	69.1
"	19 ♀♀	" "	51-80,	" " " "	76.2
tail lengths	17 ♂♂	" "	43-56%	of the total length	47.8%
			36-51%	" " " "	43.8%

For these last two characters fewer snakes were available owing to the large number whose tails were truncated or regenerated.

Breeding. Typical *olivacea* produces more eggs than its montane race.

On February 14, at Kaimosi, a ♀ held 6 eggs measuring 23 x 7 mm.

On February 19, at Kaimosi, a ♀ held 6 eggs measuring 23 x 7 mm.

Between June 11-20, at Ngatana, a ♀ held 6 eggs measuring "small"

Between June 11-20, at Ngatana, a ♀ held 6 eggs measuring 15 x 6 mm.

Between June 11-20, at Ngatana, a ♀ held 6 eggs measuring 19 x 7 mm.

Between June 11-20, at Ngatana, a ♀ held 6 eggs measuring 19 x 11 mm.

Between June 11-20, at Ngatana, a ♀ held 6 eggs measuring 22 x 10 mm.

Between June 11-20, at Ngatana, a ♀ held 6 eggs measuring 23 x 11 mm.

On June 15 at Dar es Salaam, a ♀ laid 8 eggs measuring 17 x 8 mm.,

this last lot possibly prematurely as it was shortly after capture.

Diet. This captive snake swallowed two *Rana a. fuscigula* hindlegs first on June 22, and another headfirst on June 24. Remains of a *Rana* sp. in a Witu snake; *Phrynobatrachus* sp. in a Duem specimen (Werner, 1908); *Phrynobatrachus minutus* in both a Kaimosi and a Mwaya snake; *Hyperolius milnei* at Golbanti; *Leptopelis argenteus* at ? Morogoro; *Bufo steindachneri* on four occasions at Laimi and Ngatana; fish in an Ngatana snake also. According to Pitman (1934) an Olive Marsh-Snake has been seen swallowing locust hoppers, while Corkill (1935a) mentions caterpillars in the Sudan.

Parasites. Cestodes and Pentastomida (now U.S.N.M. 47029) were present in an Mtimbuka snake.

Defensive tactics. A gentle snake, never biting, but relying on a nauseous odor (Laurent:1956). When captured, according to Pitman (1934), this small snake exhibits considerable truculence but soon becomes tame and confiding in captivity. My own impression is of violent struggling to get free which they often achieve by the loss of their tails. Only once was I personally responsible for such a loss. Having grabbed a snake by the tail, I continued holding it while getting a bag in which to drop the reptile, but its violent wriggling resulted in its breaking away, leaving the tail in my grasp. As it is also quite usual to find members of the genus *Grayia* with truncated tails, it would seem probable that aquatic snakes are more liable to seizure by waders or other waterfowl than are more terrestrial types, and by active wriggling they frequently achieve liberty by sacrificing their tails. In some localities they doubtless suffer from attacks by other predators such as turtles or fish.

Habitat. Though principally a lowland reptile, typical *olivacca* occurs up to 6400 feet in the undulating uplands of Central Africa. Schmidt (1923) has suggested this is a savanna species that has recently invaded the Congo forests; actually the Olive Marsh-Snake is a forest-edge, rather than a sylvicoline, form, occurring in clearings and open glades. More usually, however,

olivacea is found in moist situations such as, for example, beneath grass strewn on the floor of a watcher's hut in a rice swamp; beneath grass and reeds piled around the edges of native plots adjacent to a river; one was hoed up in grassland near the lakeshore, another had sought shelter beneath a bundle of thatching beside an unfinished hut (Loveridge). Two were found beneath the movable gangway of a pier by Pitman, who remarks that this marsh-snake will readily dive to hide beneath subaqueous vegetation. I once observed a marsh-snake swimming across the Tana River at a point where it was fifty yards across; on reaching the north bank the reptile paused to rest.

Localities. **Sudan:** Bahr el Jebel; *Bo River; Duem; Lake No; *Mongalla; Wau; White Nile south of Khartoum. **Ethiopia:** Lake Rudolf. ? **French Somaliland:** Côte des Somalis (Paris Mus.).²⁹ **Somalia:** Mogadiscio **Uganda:** *Bukatakata; Busu Hill; Damba Island; Entebbe; Fort Portal; *Gulu; Ibanda, Toro; Kaianja, Lake Edward; *Katwe; Kitala; Lake Bunyonyi; Lake Chahafi; Lake Edward; Lake Kyoga (Kioga); *Lake Mutanda; Lake Victoria; Lalle, Lake Kyoga; Lugasi near Kampala; Mitiana; Mjanji; *Mushongero; Nansere, Masaka; Sesse Islands. **Kenya Colony:** *Belazoni; *Golbanti; *Kaimosi; Kakamega; Kenya Mountain; *Laini; Lake Rudolf; *Mkonumbi; *Ngatana; Peccatoni; Pokomonie; *Witu; Yala River. **Tanganyika Territory:** Arusha; Bukoba; *Dar es Salaam; *Ikiju, Musoma; Ipiana; *Kabare; *Kigoma; Kilimanjaro Mtn.; Kingani; *Kipangate, Lake Rukwa; Klein Popo; Kome Id.; Madimula, Usaramo; *Magrotto Mtn. (foot of ?); Makindo River; *Morogoro; *Mwaya; *Ujiji; *Ukerewe Id. **Zanzibar Island:** Kokotoni; Zanzibar. **Mafia Island.** **Mozambique:** Angoche; Fambani; Quilimane; Rikatla; Tete; Zambezi Expedition. **Nyasaland:** Fort Hill; Karongwa to Kondowe; Lake Nyasa; *Mtimbuka; Nkata Bay to Ruarwe; "Nyika Plateau." **Northern Rhodesia:** *Abercorn; Kazungula; Lealui; Mpulungu; Petauke; Shambanza's, Nausenga River; *Wantipa, Lake Mweru; Zambezi Plains. **Southern Rhodesia:** Salisbury. **Angola:** Dundo; Malange (Malanji):

²⁹ The inclusion of Somaliland in the range by Boettger (1888a) was apparently due to the title of Mocquard's (1888) paper, but Mocquard clearly states that his single specimen came from Zanzibar. The listing of this species from Somaliland by Boulenger (1897g) was based on his (1896e) own identification of a snake from Lake Rudolf.

Muita River; north of Kwanza River; Pungo Ndongo (Adungo; Andongo). Possibly some are referable to *o. uluguruensis*. **Cambinda:** Chimehoxo. **Belgian Congo:**³⁰ *Albertville; Banana; Beni; Bitshumbi (Vitsehumbi); Boma; Bugasia, Lake Edward; Dika; Elisabethville; *Idjwi Island; Kabare, Lake Edward; Kabengere; Kabunda; Kakyelo; Kamanda, Lake Edward; Kando; Kanonga River; Kapolowe; Kasai River; Katanda; Kiambi; Kikondja; Kunungu; Lake Tanganyika; Lofoi; Lukula; Mabwe River; Maji (May) ya Moto; Makaia Ntete; Manda; Mangbatta (Monbuttu); Mati; Medje; Mokabe-Kasari; Musosa; Mutsora; Niangara; Nyonga; Parc Albert; Poko, Upper Uele; Pweto; Rungu; Ruwindi; Stanleyville; Tembwe; Zaire = Congo River; Zambi. **Ruanda-Urundi:**³¹ Bukavu; Kissenji; Muleria region. **French Congo:** Brazzaville; confluence of Dougon and Kibali Rivers; Gabon; Lambarene; Loango; Passa River region, affluent of Ogoone River; Yakoma-Abiras, Upper Oubanghi. **French Cameroon:** Garua. **British Cameroon:** Isongo (specimen re-examined by Mertens:1938b). **Nigeria:** Brass; *Lagos. **Dahomey:** Widah. **Togoland:** Kete; Misahöhe. **Ghana:**³² Achimota School (probably). **Ivory Coast:** Bouaffle. **French Guinea:** Beyla. **West Africa:** Abadafi (not located. Müller:1885b).

Range. Sudan, east to Somalia, south to Mozambique, west through Southern Rhodesia to Angola, north and west to French Guinea.

NATRICITERES OLIVACEA ULUGURUENSIS (Loveridge)

- 1882a. *Coronella olivacea* Peters (part), p. 115 (specimens with 17 scale-rows).
 1884a. Fischer, p. 6 (Masailand snake with 17 scale-rows).
 1894a. *Coronella olivacea* var. *dumerilii* Günther, p. 618 (Zomba Mtn.; material now in Brit. Mus. exhibits 17 scale-rows).
 1896d. *Tripodonotus olivaceus* Boulenger (part), p. 604 (Zomba and Mlanje Mtns.).

³⁰ For precise localization of Congo localities, see the respective articles by Witte and Laurent.

³¹ For 30 additional localities, mostly in Ruanda-Urundi, see Laurent (1956, pp. 133-134).

³² The type of *dumerilii* Günther, originally said to come from Sierra Leone (hence its listing from there by Aylmer:1922) was later stated by Boulenger (1893b) to have come from the Gold Coast = Ghana.

- 1910a. Sternfeld (part), p. 14 (Amani, though possibly 19 scale-rows).
 1911b. Nieden, p. 442 (Amani).
 1913b. Werner, p. 717 (Amani).
 1923c. Loveridge (part), p. 876 (Bagilo, though with 19 scale-rows).
 1925a. *Natrix olivacea* Loveridge (part), p. 71 (Bagilo).
 1928c. Barbour & Loveridge (part), p. 109 (all except Dar es Salaam).
 1933h. Loveridge (part), p. 231 (Rungwe Mtn. only).
 1939b. FitzSimons, V. F., p. 20 (Silinda Mtn.).
 1935. *Tropidonotus* sp., Cunha, p. 4 (Massangulo, Niassa, with 15 scale-rows).
 1935. *Tropidonotus fuliginoides* Cunha (not Günther), p. 3 (Massangulo).
 1937. Cunha (1935), p. 1778.
 1941. Themido, p. 16 (Massangulo).
 1937b. Monard, pp. 113, 115 (Kalukembe, Angola).
 1935c. *Natrix olivacea uluguruensis* Loveridge, Bull. Mus. Comp. Zoöl., **79**, p. 7; Nyange, Uluguru Mountains, Tanganyika Territory.
 1937f. Loveridge, p. 502.
 1941a. Uthmüller, p. 42.
 1947. Pakenham, p. 138.
 1940. *Xcosterophis olivaceum uluguruensis* Bogert, p. 35.
 1942a. Loveridge, p. 261.
 1953e. *Natriciteres olivacea uluguruensis*, Loveridge, pp. 252, 318.
 1953h. Loveridge, p. 143.
 1955e. Loveridge, p. 181.
 1955e. Loveridge, p. 181.
 1956c. Loveridge, p. 42.

Common Names. Montane Marsh-Snake (English); *nyoka usambia* (Sambara, but not specific).

Description. Preocular 1, rarely 2; postoculars 3, rarely 2; temporals 1 + 2, rarely 1 + 1, 1 + 2 or 2 + 2; upper labials 8, very rarely 9, the fourth and fifth, or very rarely the third, fourth and fifth, or fourth, fifth and sixth, entering the orbit; lower labials 8-10, the first 4 or 5 in contact with the anterior sublinguals, which are much shorter than the posterior. Midbody scale-rows 17, rarely 15 or 19; ventrals 125-144³³ (♂♂ 125-140, ♀♀ 130-144); anal divided; subcaudals 62-84 (♀♀ 62-77; ♂♂ 66-84).

³³ 144 for a Zomba snake (B.M. 48.1.1.87) confirmed by J. C. Battersby. If Fischer's (1884a) Masailand snake really had 17 midbody scale-rows, presumably it was an aberrant *o. olivacea*, judging by its 148 ventrals and 54 subcaudals (? intact). Cunha's (1935) counts are rejected as probably not being those of the Massangulo snake, which I have examined. Its ventrals were 135, not 153 as stated.

For characters common to all species, and tabulated data, see pp. 25-26, 28.

Color. Above, olive brown, brown, gray, or bluish black; upper lip yellowish, the labial sutures black; usually a more or less distinct darker, sometimes chocolate, vertebral band, bordered on either side by a narrower buffy one two scales wide, or rarely by a series of light dashes or dots; the coloring of the flanks impinging as olive, gray, pale blue, red, or bright mauve on the ends of the ventrals, which are otherwise yellowish (in life creamy white, bright yellow, deep orange) though sometimes edged with black.

The wide range of ventral coloring is quite irrespective of sex.

Size. Length of ♂ (M.C.Z. 23129), 430 (300 + 130) mm., from Nyingwa, *ca.* 7500 feet, the highest point at which any were taken; on the other hand, the largest ♀ (M.C.Z. 23118), 490 (350 + 140) mm., was from Nyange, only 2500 feet.

Remarks. The snake from Massangulo referred to *Tropidonotus* sp. by Cunha (1935 and 1937) agrees in all respects with known variants of this race except in its ventral count of 153 (a transposition for 135). For example M.C.Z. 44110 from Ugano, Matengo Mountains, just north of Massangulo, has 15 midbody scale-rows, 2 preoculars, and 1 + 2 temporals, while others from the same locality have 17 scale-rows, 1 preocular, and 1 + 1 temporals. Moreover, Cunha (1935 and 1937) records three other snakes from Massangulo as *fuliginoides* because they have 17 scale-rows. Through the courtesy of Dr. Themido, who reprinted Cunha's list in 1941, I have been able to examine one of these snakes and find it is unquestionably an *o. uluguruensis* with divided anal.

It might be as well to add that the scale-counts and color descriptions given by Cunha (1935) are *not* those of his specimens but translations from Boulenger's catalogues into Portuguese, which later (1937) he retranslated back into English!

Barbour & Loveridge (1928c) furnished scale-counts around neck, midbody, and preanal region, for sixty-two montane snakes. These counts were made by a student; the subcaudal range, given as 63 to 87, I have since amended to 62-84.

Dentition. See Bogert (1940).

Anatomy. The hemipenis is described by Bogert (1940).

Sexual dimorphism. This is so slight as to be negligible, as the following figures will show:

ventrals of	40 ♂♂	range from	125-140,	giving an average of	134.9
“	58 ♀♀	“ “	130-148, ³⁴	“ “ “ “	136.5
subcaudals	21 ♂♂	“ “	66-84,	“ “ “ “	74.8
“	28 ♀♀	“ “	62-77,	“ “ “ “	69.6
tail length	21 ♂♂	“ “	48-61%,	“ “ “ “	53.3%
“	28 ♀♀	“ “	43-54%,	“ “ “ “	50.0%

The last, or tail length, character, is expressed as a percentage of total length, for which only half the total number of snakes were available as exactly half of these reptiles had truncated or regenerated tail tips.

Breeding. Apparently these montane snakes lay fewer eggs than the lowland form.

On July 22, at Bagilo, a ♀ held 3 eggs measuring 22 x 6 mm.

October 8, at Nyange, a ♀ held slightly developed eggs 5 mm. in diam.

October 9, at Nyange, a ♀ held 2 eggs measuring 12 x 6 mm.

November 19, at Amani, a ♀ held 4 eggs measuring 20 x 8 mm.

November 25, at Amani, a ♀ held 4 eggs measuring 16 x 7 mm.

November 29, at Amani, a ♀ held 4 eggs measuring 21 x 8 mm.

But during November the majority of females held undeveloped ova.

Diet. Three snakes held frogs (*Arthroleptis s. lönnbergi* and *A. xenodactylus*); another eight frog's eggs; a fifth stomach contained three round white eggs, apparently a frog's but 4.5 mm. in diameter; there was a caterpillar in a sixth.

Parasites. Nematodes (*Kalicephalus micrurus*) in a Nyange snake, while in one Amani ♀ were *Kalicephalus* sp., *Ophidascaris* sp., and *Amplicaccum africanum*. A Magrotto snake held an indeterminate nematode but it is unusual for snakes of this race to be infested.

Enemies. A Cape File-Snake (*Mehelya e. capensis*) captured near Lujeri River, Mlanje Mountain, disgorged the tail of a Mon-

³⁴ These figures (130-148) are my own counts; 148 occurs in a snake (M.C.Z. 53662) from Achimota, Ghana, as well as in one (M.C.Z. 54057) from Abercorn, Northern Rhodesia.

tane Marsh-Snake. A Vine-Snake (*Thelotornis k. kirtlandii*) was observed swallowing another in a vivarium from which several marsh-snakes had already disappeared.

Defensive tactics. When seized by the tail this little snake wriggles violently until its caudal appendage breaks off. The tail-tip is missing from 41 of the 108 snakes I have examined, and the suggestion it is not only predators that are responsible is scarcely warranted by the incidence of loss as between the sexes.

Habitat. Though not primarily a forest species, this snake is frequently to be found beneath fallen bark or logs lying at the forest edge where congenially moist conditions are present. In native plots they conceal themselves in piles of rubbish or under stones. Marshy spots and the banks of streams are visited in search of small frogs, and after heavy rain these reptiles are sometimes found on paths.

I should have said that in tropical East Africa this race was essentially a montane form characterized by 17 midbody scale-rows, though at Amani (3000 feet) and on adjacent Magrotto Mountain examples with 19 scales are not uncommon. Recently, however, at Liwale (2100 feet), Mr. C. J. P. Ionides has collected abundant material of this race and found that 19 rows do not occur there, but 10% of those examined (i.e. 3 out of 28) possess 15 midbody scale-rows; such individuals also crop up in series from Songea and the Matengo Mountains.

Localities. **Tanganyika Territory:** *Liwale; Magrotto Mtn. — *Magrotto; Matengo Mtns. — *Ugano; *Mbeya; *Rovuma River; Rungwe Mtn.—*Nkuka Forest; *Songea; Tukuyu; Uluguru Mtns.—*Bagilo, *Mkangazi, *Nyange, *Nyingwa, *Vituri; Usambara Mtns.—*Amani; *Bumbuli. **Mozambique:** Massangulo. **Nyasaland:** *Cholo Mtn.; Mlanje (Milangi) Mtn.; Tengadzi River; Zomba Mtn. **Northern Rhodesia:** Fwambo. **Southern Rhodesia:** Selinda Mtn.—*Chirinda Forest. **Angola:** Kalukembe.

Range. Chiefly montane forests and marshes of Tanganyika Territory, south through northeast Mozambique to Southern Rhodesia, west to Angola.

NATRICITERES OLIVACEA PEMBANA (Loveridge)

1925a. *Natrix olivacea* Loveridge (part), p. 71.

1935e. *Natrix olivacea pembana* Loveridge, Bull. Mus. Comp., **79**, p. 8:
Chakechake, Pemba Island, north of Zanzibar Island.

1937f. Loveridge, p. 493.

1941. Moreau & Pakenham, p. 108.

1941a. Uthmüller, p. 42.

1947. Pakenham, p. 138.

Common Name. Dwarf Marsh-Snake.

Description. Preoculars 1-2; postoculars 3; temporals 1 + 2; upper labials 8, third, fourth and fifth, or fourth and fifth, entering the orbit; lower labials 8, the first 4 in contact with the anterior sublinguals, which are much shorter than the posterior.³⁵ Midbody scale-rows 15-17; ventrals 123-128 (for ♂♂ alone, consequently for both sexes); anal divided; subcaudals 49-63.

For characters common to all species, and tabulated data, see pp. 25-26, 28.

Color. Above, uniform brownish olive; upper lip yellowish, the labial sutures black; flanks olive *only slightly* impinging on the ends of the ventrals, which are otherwise yellowish.

Size. Length of ♂ (M.C.Z. 46125), 278 (200 + 78) mm., from Wete; length of holotype ♀ (M.C.Z. 19112), 285 (210 + 75) mm., from Chakechake.

Sexual dimorphism. There is no difference between the sexes in ventral counts, both ranging from 123-128, and only an average difference (♀♀ 49-56; ♂♂ 52-63) in the number of subcaudals, more marked in tail length expressed as a percentage of total length, viz. 32-35% for three ♀♀, 36-43% for three ♂♂ possessing apparently intact tails.

Remarks. For a detailed study of midbody lepidosis consult Pakenham (1947) where he points out that of eleven snakes he collected, only three had 15 midbody scale-rows, the rest having 17. However, he finds Pemba snakes are consistently recognizable in possessing 15 rows in the preanal region, while Zanzibar reptiles (which he regards as *o. olivacea* with some intermediates with *o. uluguruensis*) invariably display 17, or an occasional 16, in this region.

³⁵ Except in M.C.Z. 46126, which is abnormal on one side.

In mainland populations of *o. uluguruensis* from southeast Tanganyika Territory I have encountered five examples with 15 midbody scale-rows; these were from Liwale (3), Songea (1), and Ugano (1), in every instance the snake being one of a much larger number of typical *uluguruensis*.

Habitat. Of five snakes captured at Wete by Mr. R. H. W. Pakenham, three were taken beneath coconut husks in shade, one under a tussock in a grassy field, and one beneath a piece of wood in swampy ground.

Localities. **Pemba Island:** *Chakechake; *Wete.

Range. Pemba Island, Indian Ocean, is separated from the African mainland by a channel of exceptional depth—400 fathoms, i.e. eight times as deep as the shallow sea between Zanzibar and the adjacent coast of Tanganyika with which it was united in geologically recent times. However, the habits of this marsh-snake make transportation with agricultural produce possible.

NATRICITERES VARIEGATA (Peters)

- 1861a. *Mizodon variegatus* Peters, Monatsb. Akad. Wiss. Berlin, p. 358: Pel, Ghana.
 1902b. Mocquard, p. 415.
 1893b. *Tropidonotus variegatus* Boulenger, p. 217.
 1893c. Matschie, p. 211.
 1895f. Boulenger, p. 33.
 1896d. Boulenger, p. 603.
 1898. Boettger, p. 19.
 1901. Schenkel, p. 156.
 1908a. Sternfeld, pp. 404, 421.
 1908b. Sternfeld, pp. 211, 218.
 1909a. Sternfeld, p. 10.
 1909b. Sternfeld, p. 10.
 1916f. Chabanaud, p. 368.
 1919a. Boulenger, p. 276.
 1921a. Chabanaud, p. 467.
 1921b. Chabanaud, p. 523.
 1922. Aylmer, p. 18.
 1929a. Werner, p. 21.
 1897b. *Tropidonotus fuliginoides* Werner (?part, with 15 scales), p. 402.
 1930a. *Natrix fuliginoides* Barbour & Loveridge (not Günther), p. 772.

- 1936h. Loveridge (part), p. 21.
 1933f. *Natrix variegatus* Angel, p. 75, figs. 26-26a.
 1951. Monard, p. 147.
 1941e. *Neusterophis variegatus* Loveridge, p. 120.
 1945. Leeson, p. 1.
 1950. Leeson, pp. ix, 36, 66, 134.
 1950b. Villiers, p. 69, figs. 69-70.
 1951. Villiers p. 40.
 1954. Angel, Guibé, Lamotte & Roy, p. 386.
 1954. Dekeyser & Villiers, p. 960.
 1954b. Villiers, p. 1237.

Further citations of "*variegatus*" will be found under *fuliginoides*.

Common Name. Variable Marsh-Snake.

Description. Preoculars 1-2; postoculars 2-3; temporals 1 + 2, rarely 1 + 1³⁶; upper labials 8, rarely 7 or 9,³⁷ the fourth and fifth, rarely the fourth only, entering the orbit; lower labials 8-9, the first 4 in contact with the anterior sublinguals, which are much shorter than the posterior. Midbody scale-rows 15, rarely 13³⁸ or 17³⁹; ventrals 124-137⁴⁰ (♂♂ 124-135; ♀♀ 127-140); anal divided; subcaudals 63-78 (♀♀ 63-75; ♂♂ 73-78⁴¹).

For characters common to all species, and tabulated data, see pp. 25-26, 28.

Color. Above, dark brown to brick red; end of snout and anterior portion of parietals paler; upper lip yellowish, the labial sutures black; nuchal collar white, more or less edged with black; an ill-defined dark or brownish gray vertebral band present in young, often absent in adults; flanks brown with a dorso-lateral series of whitish dots, the brown impinging on the ends of the otherwise white ventrals, occasionally in the form of a series of dark spots.

³⁶ On right side only of a Suracoco ♂ (M.C.Z. 52218).

³⁷ Nine on right side only of a Somanya snake (M.C.Z. 55378).

³⁸ 13 in an Nzebela snake (*vide* Chabanaud: 1921a).

³⁹ 17 in an Nzo snake (C.M. 1943-S1, *vide* Angel et al:1954).

⁴⁰ Verified counts of M.C.Z. material are 124-135, but Angel et al record five higher, viz. 136 (2 snakes), 137 (2) and 140 (1). The type was said to have 143, possibly due to a transposition of figures?

⁴¹ Verified counts of M.C.Z. material are 64-74; both 63 (for a ♀) and 73 (for two ♂♂) are based on Mt. Nimba snakes (Angel et al:1954).

Size. Length of ♂ (M.C.Z. 49692), 400 (265 + 135) mm., from Mampong; length of a ♀ (M.C.Z. 22502), 341 (240 + 101) mm. The unsexed type (Leyden Mus.) was only 328 (222 + 106) mm.

Remarks. My (1936h) action in synonymizing *variegatus* with *fuliginoides* because both, with identical coloring, occur at Biteye, was ill-advised in view of the fact that 15 scale-rows is correlated with a divided anal in all fifteen *variegatus* subsequently studied by me, whereas 17 scale-rows and a single anal characterize the eight *fuliginoides* in the Museum of Comparative Zoology. Later I (1942e) pointed out they should be regarded as full species because of the considerable overlap in their distribution. Leeson's (1945) key errs in assuming the preoculars always number 2; this is the case in eight of our snakes, but only 1 preocular is present in six others.

Sexual dimorphism. There is no difference in ventral counts as between the sexes and only an average difference (♀♀ 64-76; ♂♂ 75-78) in the number of subcaudals; the difference is more marked in tail length expressed as a percentage of the total length, viz. 50-56% for six ♀♀, 60% for all four ♂♂ with tails intact.

Diet. A frog in one Paiata snake.

Parasites. A linguatulid (*Porocephalus subulifer*) from a Tafo snake was identified for me by Dr. H. R. Hill (5.ix.50).

Enemies. Chabanaud (1921a) comments on the tail being intact in only 1 of 8 snakes from French Guinea. It is truncated in only 6 of the 17 specimens (chiefly Ghanaian) in the Museum of Comparative Zoology.

Localities. **French Cameroon:** *Biteye; Yaunde. **Nigeria:** Asaba. **Togoland:** Kete; Misahöhe; *Worawora. **Ghana:** Aburi; *Achimota; *Khong, Volta River; *Kumasi; *Mampong; *Oda; Pel; *Somanya; *Tafo. **Ivory Coast:** Banco Reserve; Bossou; Gama; Keoulenta; Nzo (17 scales!); Serengbara; Tonkoui Mtn.; Ziela; Zonguepo. **Liberia:** *Bandaja; *Bolahun; Bromley; Gibi; *Piata (Paiata; Pehtah); *Suacoco. **French Guinea:** Beyla; Kerouane; Kouroussa; Macenta; Nimba Mtn.; Nzebela; Nzerekore; Sampouyara. **Sierra Leone:** (*vide* Aylmer).

Range. French Cameroon west to French Guinea.

NATRICITERES FULIGINOIDES (Günther)

- 1858c. *Coronella fuliginoides* Günther, Cat. Snakes Brit. Mus., p. 39: West Africa.
1889. Moequard, p. 143.
1896. Günther, p. 264.
- 1863d. *Meizodon longicauda* Günther, Ann. Mag. Nat. Hist., (3) 12, p. 352, pl. v, fig. A: Fernando Po.
- 1875a. Peters, p. 198.
- 1884a. Rochebrune, p. 158 (ignored).
- 1887a. Bocage, p. 184.
- 1884a. *Zacholus fuliginoides* Rochebrune, p. 156 (ignored).
- 1887b. *Coronella longicauda* sp. n. Moequard, Bull. Soc. Philom. Paris, (7) 11, p. 69: Franceville, French Congo (restricted by A.L.).
1890. *Coronella (Meizodon) variegata* Müller (not Peters), p. 692.
- 1893b. *Tropidonotus fuliginoides* Boulenger, p. 217.
- 1896d. Boulenger, p. 603.
1897. Sjöstedt, p. 24.
- 1897b. Werner (part), p. 402.
1898. Boettger, p. 19.
- 1898a. Werner, p. 212.
- 1899a. Werner, p. 135.
- 1900b. Boulenger, p. 451.
- 1902a. Werner, p. 343.
- 1905f. Boulenger, p. 185.
- 1906i. Boulenger, p. 211.
- 1908a. Sternfeld, pp. 404, 421.
- 1908b. Sternfeld, pp. 211, 227.
- 1909a. Sternfeld, p. 10, figs. 12-13.
- 1909b. Sternfeld, p. 10, figs. 10-11.
- 1909d. Werner, p. 247.
1910. Müller, p. 595.
1911. Lampe, p. 186.
- 1915a. Boulenger, p. 201.
- 1917a. Phisalix, p. 335.
1917. Sternfeld, p. 459.
- 1919a. Boulenger, p. 276.
- 1921a. Chabanaud, p. 467.
- 1921b. Chabanaud, p. 523.
1922. Aylmer, pp. 15, 18.
- 1927d. Witte, p. 321.
- 1929a. Werner, p. 21.
- 1933m. Witte, p. 85.

- 1895a. *Mizodon fuliginoides* Bocage, p. 75.
 1895c. Bocage, p. 13.
 1896b. Mocquard, p. 45.
 1897b. Mocquard, p. 8.
 1903a. Bocage, p. 42.
 1929. *Natrix fuliginoides* Flower, p. 174.
 1933f. Angel (part), p. 74 (omit Yakoma Abiras specimens).
 1940a. Mertens, p. 241.
 1951. Monard, pp. 147, 157.
 1940. *Neusterophis fuliginoides* Bogert, p. 33, fig. 3.
 1945. Leeson, p. 2.
 1950. Leeson, pp. ix, 36, 38, 66, 135.
 1950b. Villiers, p. 69.
 1953. Witte, p. 159, fig. 39.

Further citations of "*fuliginoides*" will be found under *olivacca uluguruensis* and *variegata*.

Common Names. Collared Marsh-Snake (Loveridge); Smoky Snake (Flower).

Description. Preoculars 1-2; postoculars 2-3; temporals 1 + 2, rarely 0 + 2 or 1 + 1⁴²; upper labials 8, rarely 7, the fourth and fifth entering the orbit; lower labials 8-9,⁴³ the first 4 or 5 in contact with the anterior sublinguals, which are much shorter than the posterior. Midbody scale-rows 17⁴⁴; ventrals 122-137⁴⁵; anal entire; subcaudals 75-95.⁴⁶

For characters common to all species, and tabulated data, see pp. 25-26, 28.

Color. Above, brown; end of snout and most of parietals paler; upper lip yellowish, the labial sutures usually black; nuchal collar white to buff, more or less heavily edged with black; dorsum very rarely exhibiting indistinct traces of a darker vertebral band; flanks brown with occasionally a dorsolateral series

⁴² 0 + 2 in an aberrant Metet snake (Bogert:1940); 1 + 1 on left side only of a Kribi reptile (M.C.Z. 7845).

⁴³ Allegedly 11 in a cotype of *longicauda* Mocquard (1887b).

⁴⁴ Allegedly 19 in a Congo snake (Bocage:1887a); possibly an *olivacca*?

⁴⁵ Allegedly 117 (*fdc* Angel:1933f), or 119 for a Franceville snake and 137 for a Kerouane specimen (*fdc* Guibé in litt. 8.ix.50).

⁴⁶ Allegedly 57 in a Congo snake (Bocage:1887a); possibly an *olivacca*? Sexed material too scanty to justify giving sexual ranges.

of whitish dots, the brown impinging on the ends of the otherwise white ventrals that are sometimes edged with brown or black.

Size. Length of ♂ (M.C.Z. 9265), 468 (282 + 186) mm. from Lolodorf, but surpassed in snout to anal length by a ♂ (A.M.N.H. 45927) with a head and body measurement of 370 mm., its tail, like that of the largest recorded ♀ (A.M.N.H. 50552) of 310 mm., being truncate.

Remarks. Mocquard (1887b) comments on the fact that the tails are intact in only 2 of his 6 cotypes, and later (1897b) in only 2 out of 8 snakes. Boulenger (1893b; 1896d) records intact tails in only 5 of the 12 specimens in the British Museum. The tails are intact in 2 of the 8 examples in the Museum of Comparative Zoology.

Sexual dimorphism. There is no difference in ventral counts as between the sexes, and truncated tails preclude speculation about the subcaudals or relative tail lengths.

Dentition. See Bogert (1940).

Anatomy. Parotids are present according to Phisalix (1917a). The hemipenis is well figured, described, and discussed by Bogert (1940).

Diet. A frog (*Rana museareniensis*) in stomach of a Cameroon frog (Werner, 1897b).

Habitat. Frequently seen on bush paths in Sierra Leone according to Aylmer (1922). Sternfeld (1908b), however, is mistaken in saying these snakes are confined to the coast. This author comments on the occurrence of all three species in the Cameroons, but whereas *fuliginoides* is there the most abundant and rare in Togo, the situation in Togo is reversed for *variegatus* (27 specimens) is plentiful and *fuliginoides* scarce.

*Localities.*⁴⁷ **Belgian Congo:** Albertville; Arebi; Butu-Polo; Ganda-Sundi; Kabwe; Kai-Bumba; Kapanga; Kenia Stream, affluent of Lusinga River; Kisala; Kummgn; Lofoi; Lower Congo; Lukolela; Lukonzolwe; *Makaia Ntete; Mubale-Munte; Sandoa; Tembwe; Temvo; Upoto. **French Congo:** Abiras; Alaima Leketi; Franceville; Gabon; Lambarene; Loudinia-Niari; Mayombe (Maijombe or Majumba); Ogooue. **Rio Muni:** (as Spanish Guinea). **Fernando Po:** Musola; Natividad; Sao Carlos. **French**

⁴⁷ Angolan records of snakes with 17 midbody scale-rows have divided anals and are consequently referable to *o. uluguruensis*.

Cameroon: Baga near Konn; Bipindi; Dehane; Dibongo near Edea; Dipikar; Itoki; Jengwe; Josplatte; *Kribi; Limbe; *Lolodorf; Lonji; Metet; Molunda (Molundu); Pungo Songo; *Sakbayeme. **British Cameroon:** Bibundi; Buea; Buenga-Vorwerk, Moliwe Plantation; Isongo; Johann Albrechtshöhe; Ossidinge; Victoria. **Nigeria:** Lagos; Old Calabar. **Togoland:** Misahöhe. **Ghana:** Aneober River. **Sierra Leone:** (*vide* Aylmer). **French Guinea:** Beyla.

Range. Belgian Congo northwest to French Guinea.

Genus *PHILOTHAMNUS* Smith⁴⁸

1840. *Philothamnus* A. Smith, Ill. Zool. S. Africa, Rept., footnote to text for pl. lix. Type by monotypy: *Dendrophis (Philothamnus) semivariiegata* A. Smith.
1857. *Chlorophis* Hallowell, Proc. Acad. Nat. Sci. Philadelphia, p. 52. Type by monotypy: *C. heterodermus* Hallowell.
- 1866a. *Herpetaethiops* Günther, Ann. Mag. Nat. Hist., (3) 18, p. 27. Type by monotypy: *H. bellii* Günther = *C. heterodermus* Hallowell.
1868. *Chlorophis* Theobald, Cat. Rept. Asiatic Soc. Mus., p. 49. Type by monotypy: *C. oldhami* Theobald = *Ahaetulla hoplogaster* Günther.
- 1895h. *Oligolepis* Boulenger, Ann. Mag. Nat. Hist., (6) 16, p. 171. Type by monotypy: *O. macrops* Boulenger.

In earlier days members of this genus were referred to *Coluber* (in its Linnaean sense), or to the Asiatic genera *Ahaetulla* (or its synonyms *Dendrophis* and *Leptophis*) and *Cyclophis* (now a synonym for *Ophcodrys*).

Definition. Maxillary teeth 20-40, subequal or posterior longest; mandibular teeth subequal. Head more or less elongate, distinct from neck; eye moderately large, with round pupil; nasal divided; a loreal (rarely fused with prefrontal); a preocular (rarely divided). Body cylindrical, elongate; scales smooth, with apical pits, in 11-15 rows, narrow and disposed obliquely on anterior part of body; ventrals rounded or more or less sharply keeled on either side, usually a notch corresponding to the keel in

⁴⁸The revision of this genus and those preceding it were ready for press when I received a copy of Laurent's monumental work on Central African herpetology (1956). With the preceding genera I was able to incorporate most new observations, but in the case of *Philothamnus* Laurent's wealth of material enabled him to observe aberrations almost as numerous as my own. For these and his comments on them, Laurent's paper should be consulted.

strongly keeled species. Tail long; subcaudals paired, not or but rarely keeled and notched (subgenus *Chlorophis*), or else normally keeled and notched (subgenus *Philothamnus*).

Range. All Africa (where suitable forest, savanna, bush or swamp conditions occur) south of 16° N., except in the extreme southwest (see distributional chart for the range of individual species).

Remarks. Proportions which are subject to change with growth (*vide* Parker: 1949) or other factors, do not provide a stable foundation for taxonomic purposes. Nevertheless, I have painstakingly examined all the available material for them — except the very lengthy series of *i. battersbyi*, *i. irregularis* and *s. semivariegatus*. In those forms where an abundance of material was available for study, a wide variation in scale proportions was noted. Naturally the bulk of the species fall within a mean, a few overlapping from this mean to extremes on one side or the other. A summary of these characters that are more or less common to all species in this rather homogeneous assemblage, follows:

Rostral broader than deep, the portion visible from above measuring about one quarter (*natalensis* and *semivariegatus* subspp.) or a third to a half (almost all species) to two-fifths (*heterodermus*, *hoplogaster* and *i. irregularis*) its distance from the frontal; internasals slightly shorter than, or as long as, the prefrontals (both conditions in all species where a good series was available, and in *hoplogaster* even longer than the prefrontal); frontal one-and-a-third to one-and-a-half times as long as broad (in most of the species) but one-and-a-quarter to twice as long as broad in *heterodermus*, as long as, or longer than, its distance from the end of the snout (both conditions in every form except *i. ornatus*, *s. girardi* and *s. thomensis* of which material is lacking or meagre), shorter than (in all species except *s. girardi* and *s. thomensis*) or as long as (in 7 forms) the parietals; loreal (rarely fused with a prefrontal in *hoplogaster*, *i. battersbyi* and *natalensis*) varies from one-and-a-quarter to twice as long as deep (in *i. battersbyi* and *heterolepidotus*) to one-and-two-thirds to three times as long as deep (in *s. semivariegatus*); a useful summary of loreal/nasal ratio in all British Museum material of *semivariegatus* was recently

published by Parker (1949a, pp. 58-61) but the loreals (and subcaudals) of our Pemba snakes are well within the range of variation exhibited by mainland specimens; the preocular is in contact with, or separated from, the frontal (both conditions in all ten adequately represented forms); the anterior sublinguals are shorter than, subequal to, or longer than, the posterior (all three conditions in *heterodermus*, only the two former in most of the others).

Assuming that the evolution of these snakes has proceeded from the generalized *macrops* to the specialized *semivariogatus*, we observe an increase in temporals, midbody scale rows, ventrals and subcaudals is taking place. The development of lateral keels (though these may be present or absent in several of the swamp or bush-dwelling intermediate forms) on both ventrals and subcaudals attains its highest perfection in *s. semivariogatus*, the species best adapted to an arboreal life and enjoying the widest distribution of any member of the genus. Yet it seems strange that the slight sexual difference in subcaudal counts that may be noted in *macrops* and its allies is lost in *s. semivariogatus*. If, on the other hand, we postulate that the widespread *semivariogatus* is the oldest species and developed when Africa supported more forest than is the case today, then it might be argued that the loss of keels is correlated with the departure to a more terrestrial existence in which frogs, instead of lizards, form the principal object of pursuit.

Due to the difficulty of deciding whether or not the subcaudals of an occasional *P. i. irregularis* are keeled, or those of a *s. nitidus* not, I (1951a:p. 189) suggested *Chlorophis* be regarded as of subgeneric status only, a view that has found general, though not universal, acceptance among my colleagues.

Either as *Ahaetulla*, *Chlorophis* and/or *Philothamnus*, quite a number of keys or summaries to this genus have been published by Günther (1863, pp. 283-287), Bocage (1882c, pp. 1-19), Boulenger (1894a, pp. 91-102), Günther (1895, pp. 527-528), Schmidt (1923, pp. 73-79), Hecht (1929, pp. 329-335), and Loveridge (1951c, pp. 1-12). The key now offered is the last one brought up to date. It was principally based on the abundant material in the Museum of Comparative Zoology, augmented by extensive loans of critical material from more than half-a-dozen

museums. The types of thirteen species or their synonyms, preserved in the British Museum, have been studied in detail. Unfortunately the more we know of variation in these reptiles, the more difficult it becomes to devise a clear, yet comprehensive, key. Aberrations from the normal are sufficiently frequent as to make it wise to use the key with the utmost caution, and take into consideration the ranges as set forth in the chart.

It is as well to admit that I am not satisfied about a few species and races (*i. irregularis*, *heterolepidotus*, *s. nitidus*, *s. dorsalis* and *s. semivariiegatus*) whose ventral and subcaudal counts (also, in some instances, geographical ranges) overlap. The only way to be confident that no misidentifications in the literature have been accepted, would be to borrow all the specimens listed in the literature from all the museums concerned—a somewhat overwhelming undertaking which I should like to see done.

*Key to the Species*⁴⁹

1. Subcaudals rounded or angular, occasionally faintly notched, but not so angular as to be called keeled; in most species less than 130 pairs of subcaudals⁵⁰ 2 (*Chlorophis*)
 Subcaudals sharply angular (not always so in *s. dorsalis*), keeled and notched like the ventrals; usually more than 130 pairs of subcaudals. 10 (*Philothamnus*)
2. Midbody scale-rows 13, very rarely 11 3
 Midbody scale-rows 15, very rarely 13 4
3. Anal divided, very rarely entire; usually 2 labials entering orbit; temporals 1 + 1 or 1 + 2, very rarely 2 + 2; range: montane forests of eastern Tanganyika Territory and a rice swamp in Zanzibar *macrops* (p. 58)

⁴⁹ Not every individual snake will respond to this key as exceptions to the normal are numerous in this genus. Mistakes in identification may be avoided by taking into account the range, consulting the variational and distributional charts on pp. 55-57, and checking with the full description given under each species.

Before using this key the material should be sexed by making a longitudinal slit on the underside of the base of the tail with a razor blade. If a ♂, the elongate hemipenes will be found lying side by side; if a ♀, only minor blood vessels and muscular tissue will be present.

⁵⁰ Prior to counting the subcaudals it is equally important to ascertain if the tail tapers *gradually* to a fine point. The presence of a conical point is not necessarily proof that the tail is intact, for, when lost early in life, the terminal point may be regenerated.

- Anal entire; usually 3 labials entering the orbit; temporals 2 + 2, very rarely 1 + 2, 2 + 1, 2 + 3 or 3 + 2; range: virgin forests of western Kenya (Kaimosi), west to the Cameroons and Fernando Po. Also French Guinea *h. carinatus* (p. 60)
4. Anal entire; subcaudals 79-99; temporals usually 2 + 2, occasionally 1 + 1, 1 + 2, 1 + 3, 2 + 1 or 2 + 3 5
Anal divided, very rarely entire in *i. battersbyi*, *i. irregularis* and *heterolepidotus*; subcaudals 73-134 6
5. Ventrals 142-164; adult ♀♀ attain 862 mm.; range: virgin forests of Angola, north and west to Portuguese Guinea
Ventrals 174-181; adult ♀♀ attain 962 mm.; range: virgin forests of southwest Uganda, Belgian Ruanda and adjacent Belgian Congo south to Mpala *h. heterodermus* (p. 63)
h. ruandae (p. 68)
6. Usually 2, though occasionally 3, labials entering orbit; range: eastern half of Africa 7
Usually 3, though occasionally 2, labials entering orbit; range: western Africa, penetrating the East only in the Nyasa-Zambezi region 8
7. Subcaudals in ♀♀ 73-98, in ♂♂ 87-106; range: eastern Africa south of the Usambara Mountains in Tanganyika Territory, south through Mozambique and the Rhodesias to Port Elizabeth and Durban, South Africa *hoplogaster* (p. 70)
Subcaudals in ♀♀ 90-111, in ♂♂ 100-120; range: eastern Africa in the Usambara Mountains, north through Kenya to Ethiopia, west to the Nile in the Sudan and Uganda (where it meets with the typical form), south around Lake Victoria, Tanganyika Territory
i. battersbyi (p. 76)
Subcaudals in ♀♀ 114-122, in ♂♂ 120-128; range: Transvaal, south to Natal and eastern areas of Cape Province, South Africa
natalensis (p. 98)
8. A broad brown dorsal stripe⁵¹ on back and tail; range: Angola, east to Northern Rhodesia (Lealui) *i. ornatus* (p. 82)
No such distinct dorsal stripe (unless occurring occasionally as a recessive character) 9

⁵¹ Possibly this stripe is not diagnostic in which event the name *ornatus* might be applied to all southwestern *irregularis* which have much lower scale-counts than those in the extreme northwest of Africa.

9. Subcaudals in ♀♀⁵² 97-116, in ♂♂ 103-126; build moderately slender, more so in ♂♂ than in ♀♀; range: Senegal due east to Metemma on the White Nile, south down the Rift Valley (Lakes Victoria, Tanganyika, and both sides of Nyasa) following the Zambezi to the East Coast; south of the Zambezi it occurs from Southern Rhodesia west to Damaraland, north and west to Senegal
i. irregularis (p. 85)
- Subcaudals in ♀♀ 109-126, in ♂♂ 115-134; build excessively slender, except in gravid ♀♀, but head noticeably narrower than in *i. irregularis*; range: Khartoum on the White Nile, southeast to mouth of Rovuma River, Tanganyika Territory (? Mozambique also), west to Angola, northwest to Togo, east to the Nile
heterolepidotus (p. 100)
10. Midbody scale-rows 13; range: Annobon Island, Gulf of Guinea
s. girardi (p. 124)
- Midbody scale-rows 15, rarely 13 11
11. Ventrals 153-217; subcaudals 115-161 12
 Ventrals 200-220; subcaudals 156-175; range: Sao Thomé Island, Gulf of Guinea
s. thomensis (p. 125)
12. Snout usually pale brown; temporals usually 1 + 1, very rarely 2 + 2 or 2 + 3; range: Angola, north to Cabiunda and possibly Ogowe River, French Congo
s. dorsalis (p. 121)
- Snout not distinctively colored; temporals usually 1 + 2 or 2 + 2 13
13. Ventrals 153-162; temporals usually 1 + 1 or 1 + 2, sometimes 2 + 2; range: virgin forests of French Congo, north through Cameroons, west to Ghana⁵³
s. nitidus (p. 119)
- Ventrals 164-217; temporals usually 2 + 2, sometimes 1 + 1, 1 + 2, 2 + 1 or 2 + 3; range: Eritrea south to Natal and adjacent areas of Cape Province, northwest to Gambia, i.e. all Africa south of 16° N. except Cape Peninsula, etc.
s. semivariegatus (p. 105)

⁵² This is my lowest count for an intact tail, figures in the eighties occur in the literature, chiefly from Angola. If intact, possibly these should be referred to *i. ornatus* and less stress on dorsal band.

⁵³ This is a restricted concept of *nitidus* to that previously published by me (1951c, p. 5), and which was apparently followed by Laurent (1956). See footnote to *P. s. nitidus* on this matter.

STATISTICAL DATA FOR THE SPECIES OF
PHILOTHAMNUS

(Parentheses are employed to indicate abnormal variations; others are dealt with in footnotes to the specific descriptions)

Species	Midbody scale-rows	Male ventrals	Female ventrals	Anal single divided	Female caudals (paired)	Male caudals (paired)
<i>macrops</i>	(11)13	135-146	135-148	(S) D	74-88 ⁵⁴	84-97
<i>h. carinatus</i>	13	141-157	145-167	S	72-86	78-91
<i>h. heterodermus</i>	15	142-160	152-164	S (D)	79-97	79-94
<i>h. ruandae</i>	15	174	175-181	S	82-93	99
<i>hoplogaster</i>	(13)15	141-160	143-164	D	73-98	87-106
<i>i. battersbyi</i>	15	147-169	153-177	(S) D	90-111 ⁵⁵	100-120 ⁵⁵
<i>i. ornatus</i>	15	150-160	160-166	D	85-99	102-106
<i>i. irregularis</i>	15	150-179	153-183	(S) D	87-119 ⁵⁶	103-127
<i>natalensis</i>	15	150-165	151-168	(S) D	114-122	120-128
<i>heterolepidotus</i>	15	164-193 ⁵⁷	169-193	(S) D	109-126	115-134
<i>s. semivariegatus</i>	(13)15	164-217	164-200	D	126-161	127-160
<i>s. nitidus</i>	15	153-162	154-164	D	133-151	136-153
<i>s. dorsalis</i>	15	167-190	172-180	D	115-137	128-143
<i>s. girardi</i>	13	185-197		D	143-160	
<i>s. thomensis</i>	15	200-220		D	156-175	

⁵⁴ A re-examination of the Nchingidi ♀ (M.C.Z. 48272) reported as having 69 subcaudals, suggests the tip was regenerated early in life.

⁵⁵ Uthmüller's (1938) counts of 118 for a ♀, and 123 for a ♂, require verification; unfortunately the specimens were destroyed during World War II.

⁵⁶ 87-93 in Dundo ♀♀ (*fidic* Laurent:1950) which may possibly be referable to *i. ornatus* in a new sense; 97 was encountered in an Mtimbuka ♀ (M.C.Z. 51115) and a Mushongero ♀ (M.C.Z. 48288). Boulenger (1849a) gives up to 133 for West African snakes, but I suspect some of these may be *heterolepidotus*.

⁵⁷ With a variational range in ♂ ventrals of 30, it might be supposed that two races are involved; actually both extremes come from Niangara.

Geographical Distribution of the African Genus <i>Philothamnus</i>	<i>macrops</i>	<i>h. carinatus</i>	<i>h. heterodermis</i>	<i>h. ruandae</i>	<i>hoplogaster</i>	<i>i. battersbyi</i>	<i>i. ornatus</i>	<i>i. irregularis</i>	<i>natalensis</i>	<i>heteroleptidotus</i>	<i>s. girardi</i>	<i>s. thomensis</i>	<i>s. dorsalis</i>	<i>s. nitida</i>	<i>s. semivariegatus</i>
Sudan	—	—	—	—	—	*	—	*	—	*	—	—	—	—	*
Eritrea	—	—	—	—	—	—	—	—	—	—	—	—	—	—	*
Ethiopia	—	—	—	—	—	*	—	—	—	—	—	—	—	—	—
British Somaliland	—	—	—	—	—	—	—	—	—	—	—	—	—	—	*
Somalia	—	—	—	—	—	*	—	—	—	—	—	—	—	—	*
Uganda Protectorate	—	*	—	*	—	*	—	*	—	*	—	—	—	—	*
Kenya Colony	—	*	—	—	—	*	—	—	—	*	—	—	—	—	*
Tanganyika Territory	*	—	—	—	*	*	—	*	—	*	—	—	—	—	*
Pemba Island	—	—	—	—	—	—	—	—	—	—	—	—	—	—	*
Zanzibar Island	*	—	—	—	—	—	—	—	—	—	—	—	—	—	*
Mafia Island	—	—	—	—	*	—	—	—	—	—	—	—	—	—	*
Mozambique	—	—	—	—	*	—	—	*	—	?	—	—	—	—	*
Nyasaland Protectorate	—	—	—	—	*	—	—	*	—	—	—	—	—	—	*
Northern Rhodesia	—	—	?	—	*	—	?	*	—	—	—	—	—	—	*
Southern Rhodesia	—	—	—	—	*	—	—	*	—	—	—	—	—	—	*
Bechuanaland Protectorate	—	—	—	—	—	—	—	*	—	—	—	—	—	—	*
Transvaal, South Africa	—	—	—	—	*	—	—	—	*	—	—	—	—	—	*
Natal, South Africa	—	—	—	—	*	—	—	—	*	—	—	—	—	—	*
Orange River, South Africa	—	—	—	—	*	—	—	—	—	—	—	—	—	—	—
Cape Province, South Africa	—	—	—	—	*	—	—	—	*	—	—	—	—	—	*
South-West Africa	—	—	—	—	?	—	—	*	—	—	—	—	—	—	*
Angola	—	—	*	—	—	—	*	*	—	*	—	—	*	—	*
Cabinda	—	*	*	—	—	—	—	*	—	*	—	—	*	—	—

Geographical Distribution of the African Genus <i>Philothamnus</i>	<i>macrops</i>	<i>h. carinatus</i>	<i>h. heterodermus</i>	<i>h. ruandae</i>	<i>hoplogaster</i>	<i>i. battersbyi</i>	<i>i. ornatus</i>	<i>i. irregularis</i>	<i>natalensis</i>	<i>heterolepidotus</i>	<i>s. giraudi</i>	<i>s. thomensis</i>	<i>s. dorsalis</i>	<i>s. nitidus</i>	<i>s. semivariegatus</i>
Belgian Congo	—	*	*	*	—	—	?	*	—	*	—	—	*	*	*
Belgian Ruanda-Urundi	—	—	*	*	—	—	—	*	—	*	—	—	—	—	—
French Congo	—	*	—	—	—	—	—	*	—	—	—	—	—	?	—
French Equatorial Africa	—	—	*	—	—	—	—	*	—	—	—	—	—	—	—
Annobon Island	—	—	—	—	—	—	—	—	—	*	—	—	—	—	—
Sao Thomé Island	—	—	—	—	—	—	—	*	—	—	*	—	—	—	—
Fernando Po Island	—	*	*	—	—	—	—	—	—	—	—	—	—	—	*
British Cameroon	—	*	*	—	—	—	—	*	—	*	—	—	—	*	—
French Cameroon	—	*	*	—	—	—	—	*	—	*	—	—	—	*	—
Nigeria	—	—	*	—	—	—	—	*	—	*	—	—	—	*	*
Dahomey	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Togo	—	—	*	—	—	—	—	*	—	*	—	—	—	*	*
Ghana	—	—	*	—	—	—	—	*	—	—	—	—	—	*	*
Ivory Coast	—	*	—	—	—	—	—	*	—	—	—	—	—	—	—
Liberia	—	—	*	—	—	—	—	*	—	—	—	—	—	—	*
Sierra Leone	—	—	*	—	—	—	—	*	—	—	—	—	—	—	—
French Guinea	—	—	*	—	—	—	—	*	—	—	—	—	—	—	*
Portuguese Guinea	—	—	*	—	—	—	—	*	—	—	—	—	—	—	*
Gambia	—	—	—	—	—	—	—	*	—	—	—	—	—	—	*
French West Africa	—	—	—	—	—	—	—	*	—	—	—	—	—	—	*

PHILOTHAMNUS MACROPS (Boulenger)

- 1895b. *Chlorophis neglectus* Werner (not Peters), p. 193.
 1895b. *Oligolepis macrops* Boulenger, Ann. Mag. Nat. Hist., (6) 16. p. 171:
 Usambara Mountains, Tanganyika Territory.
 1896d. Boulenger, p. 644.
 1896. Tornier, p. 78.
 1897. Tornier, p. 78 (reprinted).
 1897b. Tornier, p. 65.
 1908. *Chlorophis macrops* Sternfeld, p. 95.
 1910a. Sternfeld, p. 19.
 1911b. Sternfeld, p. 442.
 1913b. Werner, p. 717.
 1915c. Boulenger, p. 623.
 1924b. Loveridge, p. 5.
 1928c. Barbour & Loveridge, p. 116.
 1929. Hecht, p. 330.
 1929a. Werner, p. 100.
 1934c. Mertens, p. 157.
 1937f. Loveridge, p. 502.
 1941a. Uthmüller, p. 40.
 1942e. Loveridge, p. 270.
 1947. Pakenham, p. 140.
 1951c. Loveridge, pp. 3, 6.

Common Names. Usambara Green-Snake (Loveridge); nyoka ya mani (Sambaa:Loveridge).

Description. Preoculars 1, rarely 2; postoculars 2; temporals 1 + 1, 1 + 2 (or 2 + 2,⁵⁸ *vide* Sternfeld); upper labials 8, occasionally 9, the fourth and fifth (or fourth, fifth and sixth,⁵⁸ *vide* Sternfeld) or fifth and sixth entering the orbit; lower labials 8-12, the first 4, 5 or 6 in contact with the anterior sublinguals. Midbody scale-rows 13, rarely 11; ventrals 135-148⁵⁹ (♂♂ 135-146; ♀♀ 135-148); anal divided, rarely entire (M.C.Z. 23236 and some Zanzibar snakes only); subcaudals 74-97 (♀♀ 74-88; ♂♂ 84-97).

For characters common to all species, and synopsis of scale-counts, see pp. 49-52, 55.

⁵⁸ If these two aberrations were on the same snake, one wonders if a young *Philothamnus s. semivariegatus* might not have been included in Sternfeld's long series; impossible if he included all scale-counts.

⁵⁹ 148 in the ♀ holotype, confirmed by me, though I find 81, not 75 subcaudals.

Color. Above, green or bronzy green to olive or brown, the upper lip white; sometimes as many as 42 irregular light cross-bars formed by scales with a light yellow or green, black-edged, basal spot turning to light blue on flanks. Below, chin and throat white; rest of under surface pale green, yellowish green, or bluish-white, uniform, or each ventral shield with a lateral dull red blotch, or laterally bordered with black, the free edge tinged with bluish-gray.

Size. Length of ♂ (M.C.Z. 23236) 810 (560 + 250) mm.; of a ♀ (M.C.Z. 23239) 950 (690 + 260) mm.; the unsexed juvenile holotype ♀ (Brit. Mus.) now measures 222 (165 + 57) mm., the youngest topotype ♂ (M.C.Z. 23246) 200 (130 + 70) mm.

Remarks. It was by the inclusion of a couple of the then undescribed *P. i. battersbyi* in their series of *macrops* from Amani, that Barbour & Loveridge (1928c) unduly increased the range of ventrals and subcaudals for that species. These two green snakes may be distinguished by *macrops* possessing fewer ventrals, i.e. 135-148 (147-177 in *battersbyi*), fewer subcaudals by sexes, i.e. 69-88 in ♀♀ (90-111 in ♀♀ *battersbyi*), 84-97 in ♂♂ (100-120 in ♂♂ *battersbyi*), and 13 (instead of 15) mid-body scale rows. In this reduction of scale rows *macrops* parallels the situation of two other Amani forest-edge snakes which have lowland representatives: — *Natriciteres o. uluguruensis* (17 scales) *N. o. olivacea* (19 scales), *Crotaphopeltis h. tornieri* (17 scales), *C. h. hotamboeia* (19 or 21).

Sexual dimorphism. In ♀♀ the subcaudals range from 69 to 88.

In ♂♂ the subcaudals range from 84 to 97.

Breeding.

On November 19, at Amani, a ♀ held 5 eggs of 29 x 11 mm.

“ 20, “ “ “ 6 “ 36 x 15 mm.

“ 22, “ “ “ 14 “ 30 x 12 mm.

“ 24, “ “ “ 3 “ 34 x 10 mm.

Diet. A chamaeleon (*Brookesia brevicaudata*); tail of a skink; and a frog (*Arthrolepis s. whytii*) were recovered from stomachs, but those of 15 other snakes taken at Amani during November were empty!

Habitat. In bushes fringing the forest and along the borders of nearby streams. Reported from a rice field in Zanzibar by Pakenham.

Localities. **Tanganyika Territory:** Rondo Plateau—*Nehingidi; Tanga; *Usambara Mountains—*Amani; Nguelo. **Zanzibar Island:** Kinuni, Moshi.

Range. Coastal Tanganyika Territory and, probably introduced by human agency, the adjacent island of Zanzibar.

PHILOTHAMNUS HETERODERMUS CARINATUS (Andersson)

- 1897b. *Chlorophis heterodermus* Moequard (not Hallowell), p. 12.
 1897b. Werner, p. 403.
 1933m. Witte (part), p. 89 ("Dika" should read Arebi).
 1901. *Chlorophis carinatus* Andersson, Svenska Vetensk.-Akad. Handl., **27**, No. 5, p. 9; Mpanja, British Cameroon.
 1908a. Sternfeld, pp. 407, 425.
 1909b. Sternfeld, p. 15.
 1910. Müller, p. 601.
 1911. Lampe, p. 193.
 1915a. Boulenger, p. 205.
 1916. Andersson, p. 30.
 1917. Sternfeld, p. 470.
 1919a. Boulenger, p. 282.
 1919g. Boulenger, p. 23.
 1923. Schmidt, p. 74.
 1927d. Witte, p. 323.
 1929. Hecht, p. 331.
 1929a. Werner, p. 100.
 1933m. Witte, p. 80.
 1934a. Schwetz, p. 380.
 1936h. Loveridge, p. 28.
 1936j. Loveridge, p. 243.
 1936. Pitman, p. 274, pl. v, fig. 1; pl. E, fig. 4.
 1937f. Loveridge, p. 502.
 1938a. Pitman, p. 304.
 1938b. Pitman, pp. 39, 87, 88, 295, 304-5, pls. (as in 1936).
 1940. Bogert, p. 51.
 1941. Mertens, p. 278.
 1941. Witte, p. 199.
 1942e. Loveridge, p. 270.
 1951. Monard, p. 150.
 1951c. *Philothamnus heterodermus carinatus* Loveridge, pp. 3, 6.
 1953. Witte, p. 193, fig. 55.
 1954. Angel, Guibé, Lamotte & Roy, p. 392.
 1954d. Laurent, pp. 296, 297.
 1954b. Villiers, p. 1240.

Common Names. Thirteen-scaled Green-Snake (Loveridge); *kangasira* (Gishu:Loveridge); *lushangabanyeri* (Lega:Loveridge); *mukangaeni* (Kiga: Pitman).

Description. Preocular 1; postoculars 2, rarely 1, 3, or 4; temporals 2 + 2, rarely 1 + 2, 2 + 1, 2 + 3, or 3 + 2; upper labials 8-10, the fourth, fifth and sixth; rarely third, fourth and fifth; the fourth and fifth only; the fourth fifth, sixth and seventh; or fifth, sixth and seventh, entering the orbit; lower labials 8-11, the first 4, 5 or 6 in contact with the anterior sublinguals.

Midbody scale-rows 13; ventrals 141-167 ($\delta \delta$ 141-157; $\text{♀} \text{♀}$ 145-167); anal entire; subcaudals 72-91 ($\text{♀} \text{♀}$ 72-86; $\delta \delta$ 78-91).

For characters common to all species, and synopsis of scale-counts, see pp. 49-52, 55.

Color. Above, green or olive; young with more or less distinct dark crossbars that tend to disappear with age; vertebral scales baso-laterally edged with pale blue. Below, chin white; throat yellowish; body and tail yellowish green to pale green.

In alcohol indistinguishable from the coloring of *P. hoplogaster* which was abundant at Sipi. Fortunately, I recorded the coloring of a freshly killed Sipi δ *carinatus* in the field, being struck by its difference from *hoplogaster*.

Above, dark olive with 104 deep-black, irregular crossbands between head and anus; on the tail these are represented by black flecks; the olive scales between the crossbands are edged with pale blue on the anterior two-thirds of the body; upper lip brownish olive anteriorly, white below the eye shading off into olive posteriorly. Below, throat pure white, anterior ventrals tinged with yellow, remainder of the under surface dark green with its anterior third heavily suffused with yellow; on the anterior two-thirds edged with yellow laterally, on the posterior third with bluish white, on the tail with dusky.

Center of the eye black, surrounded by a light area, then by a fine orange line, then by an olivaceous area flecked with black; outermost ring, black.

Size. Largest δ (M.C.Z. 42907), 721 (540 + 181) mm., from Bondo; a ♀ cotype (No. 1974), 815 (600 + 215) mm.; the youngest, a δ (M.C.Z. 40483), 408 (303 + 105) mm., is from Kaimosi.

Remarks. The recent (1954) discovery of *P. h. carinatus* with *P. h. heterodermus* in French Guinea, makes it extremely doubtful whether *carinatus* should be recognized as separable from *heterodermus*, its sole distinguishing feature being 13 midbody scale-rows. I retain it tentatively solely in the hope that further light may be shed on the incidence and range of *carinatus*.

P. h. heterodermus is present in 6 of the 9 countries from which *h. carinatus* has been recorded, but until its recent discovery on Mt. Nimba *carinatus* was unknown from west of the Cameroons, whereas typical *heterodermus* ranges all the way to Sierra Leone. Both forms occur together at Metet (M.C.Z. material), and have been recorded as doing so at Johann Albrechtshöhe; Ebolowa; Lonji; Molundu and Mukonje Farm, in the Cameroons (Sternfeld:1908a); both from Dika⁶⁰; Medje; Stanleyville and Temvo, in the Belgian Congo (Witte:1933m etc.).

On the other hand one might say that *P. h. carinatus* is the Central African representative of the eastern forest *macrops*, seemingly an offshoot now separated by 450 miles. These are the only two members of the subgenus *Chlorophis* that regularly have 13 midbody scale-rows. See also comments by Laurent (1956) received after the above was written.

Dentition. In describing *carinatus* Andersson reported it as having "about 40" maxillary teeth. Bogert (1940) found 39, 41 and 42, of which the posterior 4 or 5 were larger and stouter than the rest. Dealing with Congo specimens, Bogert emphasizes the close affinities with *heterodermus*, not only in dentition, lepidosis, color and habitus, but also in hemipeneal characters.

Hemipenis. Not bifurcate; sulcus spermaticus undivided; basal spines well developed and merging distally into reticulate calyces which grade into numerous flattened papillae towards the tip, which extends to the sixth or seventh caudal (Bogert etc.).

Sexual dimorphism. A scarcely appreciable tendency for ♂♂ to average fewer ventrals and more subcaudals than ♀♀.

Diet. A frog (Sternfeld:1910).

Enemies. One recovered from the digestive tract of a vine-snake (*Thelotornis k. kirtlandii*) from whose mouth 30 mm. of the green snake's tail still protruded (Bogert).

⁶⁰ Both Dika specimens examined by me.

Habitat. Essentially a rain-forest form, but at Avakubi a *carinatus* fell from the thatch on to the collector's table (Schmidt).

Localities. **Uganda:** *Budongo Forest; Kayonza Forest, Kigezi (fide Pitman); *Sipi Forest, Mount Elgon. **Kenya Colony:** *Kaimosi. **Cabinda. Belgian Congo:** *Arebi; Avakubi; Babonde s. of Medje; Bafwasende; *Bambesa, Uele; Batama; Beni; Bunyakiri; *Buta; [Dika: in error]; Eala; Faradje; *Ibembo, Uele; *Idjwi Island—Upper Mulinga River; Ituri; Kande River; Kansenia; Kasai; Kaswabilenga; Katanga; *Kulu River; Kunungu; Lissinu; Lukawe River; Lukolela; Lusema; Maganga Bay; Manda; Manguretshipa; Medje (as Madié); Mombaka; *Mpala, Lualaba; *Mpesi-Ukesi, Lower Congo; Munoi; Nala; Niapu; *Panga, Aruwimi River; Shabunda region; *Stanleyville; Temvo; *Yangambi, Stanleyville; Walikale; *Zambi, Ubangi; *Zobia, Uele. **French Congo:** Lambarene (as *heterodermus*). **Fernando Po:** Bokoko-Garcia. **French Cameroon:** Dibongo; Ebolowa; Longji; *Metet; Molundu; Mukonje Farm. **British Cameroon:** Barombi; Bibundi; Buea; Camp; Isongo; Johann Albrechtshöhe; Mapanga (type locality). **French Guinea:** Mt. Nimba—Gouela; Nion.

Range. Western Kenya Colony, west through the Belgian Congo to Fernando Po. Also French Guinea.

PHILOTHAMNUS HETERODERMUS HETERODERMUS (Hallowell)

1857. *Chlorophis heterodermus* Hallowell, Proc. Acad. Nat. Sci. Philadelphia, p. 54: Gabon = French Congo.
1860. Cope, p. 559.
- 1884a. Rochebrune, p. 173 (not used).
- 1894a. Boulenger, pp. 97, 358.
- 1896d. Boulenger, p. 631.
1897. Sjöstedt, p. 35.
1898. Boettger, p. 58.
- 1898a. Werner, p. 209.
- 1899a. Werner, p. 137.
- 1900b. Boulenger, p. 452.
- 1902a. Werner, pp. 338, 344.
- 1906i. Boulenger, p. 213.
- 1908a. Sternfeld, pp. 407, 425.
- 1908b. Sternfeld, pp. 214, 230.

- 1909a. Sternfeld, p. 14, fig. 20.
1909b. Sternfeld, p. 15, fig. 15.
1909d. Werner, p. 247.
1910. Müller, p. 601.
1912c. Boulenger, p. 470.
1917a. Phisalix, p. 334.
1917. Sternfeld, p. 469.
1919a. Boulenger, p. 282.
1921a. Chabanaud, p. 468.
1921b. Chabanaud, p. 524.
1922. Aylmer, pp. 15, 19.
1927d. Witte, p. 323.
1929. Hecht, p. 331.
1929a. Werner, p. 101.
1933f. Angel, p. 105, figs. 38-38a.
1933. Schouteden (part ?), p. 236.
1933j. Witte, p. 123.
1933m. Witte (part), p. 89.
1934c. Mertens, p. 169.
1934a. Schwetz, p. 380.
1936h. Loveridge (part), p. 29.
1936e. Parker, p. 125.
1938a. Pitman, pp. 294, 305, pl. xvii, fig. 3, pl. T, fig. 2.
1940. Bogert, p. 52.
1940a. Mertens p. 241.
1940b. Monard, p. 174.
1941. Witte (part), p. 198.
1945. Leeson, p. 1.
1948d. Cansdale, p. 45, photo.
1950. Leeson, pp. ix, 39, 40, 66, 133.
1950a. Villiers, p. 59.
1950b. Villiers, p. 80, figs. 94-95.
1951. Monard, p. 149.
1863e. *Ahaetulla heteroderma* Günther, p. 285.
1885. Müller, p. 683.
1866a. *Herpetaethiops Bellii* Günther, Ann. Mag. Nat. Hist., (3) 18, p. 27, pl. vii, fig. B: Sierra Leone, i.e. Victoria, Sherbro Island, Sierra Leone.
1884a. Rochebrune, p. 171 (not used).
1875a. *Philothamnus heterodermus* Peters, p. 199.
1882e. Bocage, p. 18.
1888a. Boettger, p. 59.
1891b. Matschie, p. 615.

- 1893c. Matschie, p. 212.
 1895a. Bocage, p. 89.
 1882a. *Ahaetulla* sp. Müller, p. 149.
 1885. Müller, p. 683.
 1884b. *Philothalmus heterodonta* (*sic*) Sauvage, p. 201.
 1893. *Philotamnus eterodermus* (*sic*) Prato, p. 11.
 1916f. *Chlorophis heterodermus Pobeguini* Chabanaud, Bull. Mus. Hist. Nat. (Paris), **22**, p. 371, fig. 12: French Guinea.
 1929. Hecht, p. 331.
 1933f. Angel, p. 106.
 1940b. Monard, p. 174.
 1929. *Chlorophis cyaneus* Hecht, Zool. Anz., **81**, pp. 331, 334, figs. 1-2: Ajoshöhe, Nyong River, British Cameroon.
 1951. Monard, p. 150.
 1951c. *Philothamnus heterodermus heterodermus* Loveridge, pp. 3, 6.
 1954. Angel; Guibé; Lamotte & Roy, p. 392.
 1954b. Villiers, p. 1240.

Further citations of "*heterodermus*" will be found under *h. carinatus*.

Common Names. Emerald Green-Snake (Aylmer); Variable Tree-Snake (Cansdale); *boprakala* (Temme:Aylmer); *ndawundukali* (Mende:Aylmer); Pitman supplies the general Ganda and Kiga names for *Chlorophis*, but unless *h. carinatus* is a synonym it is questionable whether *h. heterodermus* occurs in Uganda.

Description. Preoculars 1, sometimes 2; postoculars 2, rarely 1 (*vide* Angel) or 3; temporals occasionally 1 + 1, 1 + 2, 1 + 3 (*vide* Müller) or 2 + 1, though normally 2 + 2 or 2 + 3; upper labials 8-10, the third, fourth and fifth⁶¹; fourth and fifth (type of *cyaneus*); fourth, fifth and sixth; fifth and sixth (type of *pobeguini* on one side only); or fifth, sixth and seventh, entering the orbit; lower labials 9-11, the first 5, rarely 4,⁶² in contact with the anterior sublinguals. Midbody scale-rows 15; ventrals 152-164 (♂♂ 142-160; ♀♀ 152-164); anal entire, rarely divided⁶³; subcaudals 79-97 (♀♀ 80-97; ♂♂ 79-94).

⁶¹ On right side of a Kumasi ♂ (M.C.Z. 53691), on whose left side is the more usual 9, with fourth, fifth and sixth entering.

⁶² On left side of an Achimota ♂ (C.N.H.M.), on whose right side are the normal 10 labials, the first 5 of which are in contact with the anterior sublinguals (examined by A.L.).

⁶³ Divided in a Somanya ♂ (M.C.Z. 55212).

For characters common to all species, and synopsis of scale-counts, see pp. 49-52, 55.

Color. Above blue-green or olive, the interstitial skin black; anterior part of back in young occasionally shows a longitudinal series of paired black spots that sometimes coalesce to form cross-bars; some scales spotted with white, with or without a dark edge. Below, chin and throat yellowish cream; body and tail cream to pale or bluish green.

In life, writes Cansdale (letter of 23.ii.51), an Oda snake measuring 635 (465 + 170) was: Above, head dark olive brown; body olive brown with irregular dark crossbands and noticeably white between scales. Below, throat and body orange yellow gradually merging into dark slate posteriorly; tail uniformly dark slate. However, another Oda snake of 549 + 190 mm. (No. 183), as also a Kumasi specimen (No. 154), were recorded as "Black."

Such melanistic individuals, says Cansdale, might easily be mistaken for a small black cobra. In this connection it will be noted that the type of *bellii* was described as: Above, deep black. Below, deep black except for chin, throat and thirty anterior ventrals, which are whitish. I assumed that this was due to formalin preservation until I came across Dr. Harley's reference to a Ganta snake being purple with a green head (Bogert), and Cansdale's comments about a similarity to a small black cobra.

Size. Length of ♂ (type of *pobeguini* in P.M.) 780 (595 + 185) mm., but a comparison with the measurements of a ♀ suggests the tail tip is regenerated; consequently Chabanaud's count of 77 caudals is rejected. Length of ♀ (type of *bellii* in B.M. 46.1.10.27) 867 (650 + 217) mm., but surpassed by another ♀ (B.M. 36.8.1.669) of 886 (660 + 226) mm. from Congulu; the youngest, a ♀ (M.C.Z. 13230) from Metet, 344 (255 + 89) mm.

Remarks. *P. h. heterodermus* is probably an offshoot of *irregularis*, from normal specimens of which it differs in having fewer subcaudals (see chart on p. 55), a single anal, and usually 2 + 2 temporals — though both these last characters may occur occasionally in *irregularis*.

The possibility of a short-tailed western race occurring in Sierra Leone requires investigating; if recognizable, the name *bellii* would be available. Though normal *heterodermus* have been reported from Portuguese and French Guinea, *P. h. pobeguini* was based on a single specimen from the latter country. The type had only 2 upper labials entering the orbit, and a temporal arrangement of 2 + 1 on the right side, 1 (incompletely divided) + 1 on the left side. Monard has recorded a second specimen from Portuguese Guinea, having 9 upper labials, the fifth and sixth entering the orbit, and temporals 1 + 1. Two Cameroon snakes (M.C.Z. 7849; 13233) with the normal 9 upper labials, of which the fourth, fifth and sixth enter the orbit on one side of the head, have the *pobeguini* arrangement on the other side. Further discussion on the synonymy of this snake, and that of *cyaneus*, will be found in an earlier (1936h) paper by me.

Dentition. The type of *cyaneus* had 30-32 maxillary teeth (Hecht); there were 33 and 35 in two Cameroon *heterodermus* examined by Bogert (1940), who points out that this species apparently has 5 more maxillary teeth than *irregularis*. See also Leeson (1950).

Anatomy. The presence of parotids is discussed by Phisalix (1917a).

Hemipenis. Not bifurcate; sulcus spermaticus undivided; basal spines enlarged and followed by 2 or 3 flosses, merging distally into reticulate calyces which grade into numerous fine papillae towards the tip, which extends to the seventh caudal (Bogert).

Sexual dimorphism. Negligible, though probably some average differences could be demonstrated with more material.

Breeding. In June, at Dika, a ♀ held eggs measuring about 23 x 7 mm. (A.L.). In November, at Worawora, a ♀ held 5 eggs measuring about 35 x 10 mm.

Diet. A frog (Werner:1909d); feeds on lizards in Sierra Leone according to Aylmer (1922).

Habitat. Frequently found in gardens, according to Aylmer (1922), who may be confusing it with *i. irregularis*.

Localities. **Angola:** *Congulu. **Belgian Congo:** *Banana; Burunga; *Dika; Ganda-Sundi; Kai-Bumbi; Kamatembe; Kibumba; Kisala; *Kisantu; *Lufu; Lukula; *Makaia Ntete; Medje; Povo Nemlao; Rugari; *Stanleyville *Temvo* Tshumba. **French Equatorial Africa:** Fort Sibut; Gabon. **Fernando Po:** Bahia de Sao Carlos. **French Cameroon:** Bipindi; Bitye; Ebolowa; *Efulen; *Kribi; Longji; *Metet; Molundu; Mukonje Farm, Mundame; *Sakbayeme. **British Cameroon:** Ajoshöhe, Nyong River (type of *cyaneus*); Johann Albrechtshöhe; Buea; Tiko; Victoria. **Nigeria:** Lagos; Niger River; Oban District; Oil River. **Togo:** Adele (Bismarckburg); Misahöhe; *Worawora. **Ghana:** Acera; *Achimota; *Adjikpo; Ashanti; *Kumasi; Odumasi; *Somanya. **Ivory Coast:** Banco Reserve; Tonkui Mountain. **Liberia:** Ganta; *Suacoco. **Sierra Leone:** Freetown; Victoria, *Sherbro Island (type of *bellii*). **French Guinea:** Guelemata; Macenta; Nimba Mountain; Nion; Nzebela; Nzo; To Mountain. **Portuguese Guinea:** Catio; Madina Boe; Rio Cassine.

Range. Angola north and west to Portuguese Guinea (for Uganda, Ruanda, and some eastern Congo records, see *heterodermus ruandae*).

PHILOTHAMNUS HETERODERMUS RUANDAE Loveridge

- 1933j. *Chlorophis heterodermus* Witte (not Hallowell), p. 123.
 1933m. Witte (part), p. 89 (Birunga; Lulenga).
 1936h. Loveridge (part), p. 29 (Lake Kivu).
 1941. Witte (part), p. 198 (Kamatembe; Lake Kivu; Rugare).
 1951e. *Philothamnus heterodermus ruandae* Loveridge, Inst. roy. Sci. nat. Belgique, Bull. 27, No. 37, pp. 2, 7; ♀ ex Mulungu, Lake Kivu, Belgian Congo.
 1953. Witte, p. 195.
 1956. Laurent, p. 174, fig. 26, pl. xix, fig. 1.

Common Name. Ruanda Emerald-Green-Snake.

Description. Preoculars 1-2⁶⁴; postoculars 2; temporals 1 + 2. 2 + 2 or 2 + 3; upper labials 8-10, the third, fourth and fifth; fourth, fifth and sixth; or fourth, fifth, sixth and seventh enter-

⁶⁴Two on the left side of a Kayonza ♂ (C.N.H.M. 6975).

ing the orbit; lower labials 8-11, the first 4, 5 or 6 in contact with the anterior sublinguals. Midbody scale-rows 15; ventrals⁶⁵ 165-181 (♂♂ 165-174; ♀♀ 175-180); anal entire; subcaudals 82-100 (♀♀ 82-93; ♂♂ 98-100).

Color. As in *P. h. carinatus*, with the snout and throat at least partially drab (Laurent).

Size. Total length of ♂ (C.N.H.M. 6975) 725 (515 + 210) mm.; largest ♀ (I.G. 16964) 962 (730 + 232) mm.; holotype ♀ (I.G. 15860) 912 (680 + 242) mm.

Remarks. From its nearest relatives (of which I have about 75 and 40 counts respectively, the 7 specimens of *ruandae* seen by me and an additional 20 or so listed by Laurent (1956), differ in their more numerous ventrals and larger size; characters best seen in a comparative table.

Species	Mid-body scale-rows	Ventrals in ♂♂	Ventrals in ♀♀	Caudals in ♀♀	Caudals in ♂♂	Largest ♀ in mm.
<i>h. carinatus</i>	13	141-157	145-167	72-86	78-91	815 (600 + 215)
<i>h. heterodermus</i>	15	142-160	152-164	79-97	79-94	886 (660 + 266)
<i>h. ruandae</i>	15	165-174	⁶⁵ 171-181	82-93	98-100	962 (730 + 232)

Sexual dimorphism. In addition to the ventral and subcaudal counts tabulated above, Laurent finds the percentage of tail lengths into total lengths of 15 ♀♀ is 24 to 26.6%, while in 3 ♂♂ it is only 27.5 to 29%.

Diet. Frogs recovered from stomachs of *ruandae* by Laurent, have been identified as *Leptopelis karissimbiensis* (ex Alimbongo); *Schoutedenella* sp. (ex Kabilombo), and *Rana fuscigula* (ex Mount Kabobo).

Localities. **Uganda:** Impenetrable Forest, Kayonza, British Ruanda. **Belgian Ruanda-Urundi:** Bugarama; Kabobo; *Lake Kivu; *Lulenga; Mulungu; Nyongwe. **Belgian Congo** in Kivu region: Alimbongo; Burunga; Kabilombo; Kabumbe; Kama-tembe; Kibumba; Rugare; Tshumba; Uvira; also allegedly from Mpala, Kanzenze, Lualaba District.⁶⁶

⁶⁵ 164 in a Kabobo ♀ according to Laurent (1956) who considers it aberrant.

⁶⁶ See Laurent, whose paper is a major contribution to our knowledge of this form, for reasons why this locality is probably erroneous.

Range. Southwestern Uganda, west through Belgian Ruanda-Urundi to the Belgian Congo.

PHILOTHAMNUS HOPLOGASTER (Günther)

- 1863c. *Ahaetulla hoplogaster* Günther, Ann. Mag. Nat. Hist., (3) 11, pp. 284, 286: "Port Natal" i.e. Durban, Natal, South Africa.
1890. Boulenger, Fauna British India, Rept. & Batr., p. 305.
- 1866b. *Philothamnus neglectus* Peters, Monatsb. Akad. Wiss. Berlin, p. 890, footnote: "Prazo Boror" i.e. Boror, Mozambique.
- 1882a. Peters, p. 130, pl. xixA, fig. 2.
1893. Pfeffer (part), p. 84 (omit Usambara).
- 1896a. Bocage, p. 92.
1868. *Chlorophis Oldhami* Theobald, Cat. Rept. Asiatic Soc. Mus., p. 49: "Simla, India" (in error).
1876. *Cyclophis oldhami* Theobald, Rept. British India, p. 159.
- 1882c. *Philothamnus hoplogaster* Bocage, p. 17.
- 1887h. Boulenger (part), p. 176 (omit Wynberg and Damaraland).
- 1951e. Loveridge, pp. 4, 7.
1953. Loveridge, pp. 260, 318.
- 1894a. *Ahaetulla neglecta* Günther, 1893, pp. 618, 620.
1898. Johnston, p. 361a.
- 1894a. *Chlorophis hoplogaster* Boulenger (part), p. 93, pl. v, fig. 2 (omit Damaraland and Lake Victoria).
1898. Boettger, p. 58.
1898. Selater, p. 99.
1898. Werner, 1896-7, p. 143.
- 1907j. Boulenger, p. 486.
- 1907c. Roux, p. 734.
- 1908b. Boulenger, p. 228.
1908. Gough, p. 24.
- 1910b. Boulenger (part), p. 507 (omit key, etc.).
- 1910a. Hewitt, p. 57.
- 1910a. Sternfeld (part), p. 18.
1912. FitzSimons, F. W. (part), pp. 86, 87, 92 (omit key).
1913. Boettger, p. 363.
- 1914a. Hewitt (part), pp. 242, 245, 246 (omit counts).
- 1915a. Boulenger (part), p. 205.
- 1915c. Boulenger (part), p. 622.
1929. Flower, p. 203.
1929. Hecht (part), p. 332.

- 1929a. Werner, p. 100.
1933h. Loveridge (part), p. 236 (omit Ukerewe Id.).
1934. Pitman, p. 294.
1935. Cott, p. 966.
1935. Power, p. 334.
1937e. Hewitt, p. 59, fig. 1.
1937f. Loveridge, pp. 489, 496, 503.
1939b. FitzSimons, V. F., p. 22.
1940. Bogert (part), p. 54 (omit Lukolela).
1950. Rose, pp. 271, 320, fig. 166 (photo); p. 314, fig. 8 (head).
1955. Rose, pp. 93, 97 (faulty key), fig. 43 (photo); p. 178, fig. 8 (head).
1894a. *Chlorophis neglectus* Boulenger (part), p. 94 (omit localities in Kenya and Tanganyika).
1896d. Boulenger (part), p. 631 (omit Witu).
1896. Peracca, p. 2.
1897. Tornier, p. 65.
1898. Tornier, p. 294.
1899a. Mocquard, p. 219.
1907a. Boulenger, p. 10.
1907. Lönnberg, p. 15.
1908b. Mocquard, p. 558.
1908c. Sternfeld, p. 246.
1910b. Boulenger (part), p. 507 (omit key).
1910. Peracca, p. 4.
1910a. Sternfeld (part), p. 18 (omit Kagera, etc.).
1912. FitzSimons, F. W. (part), pp. 86, 87 (omit key).
1912. Peracca, p. 5.
1913. Boettger, p. 345.
1913. Hewitt & Power, p. 162.
1915a. Boulenger (part), p. 205.
1915c. Boulenger (part), p. 623.
1915d. Boulenger (part), p. 648.
1928c. Barbour & Loveridge (part), p. 115 (omit Usambara localities).
1928. Cott, p. 953.
1928j. Loveridge, p. 74.
1929. Flower, p. 203 (omit range).
1929. Hecht (part), pp. 332, 333.
1929a. Werner (part), p. 100.
1933h. Loveridge, p. 237.
1934. Pitman, p. 294.
1935. Cott, p. 966.

- 1937a. Parker, p. 630.
 1941. Moreau & Pakenham, p. 108.
 1941. Themido, p. 16.
 1942c. Loveridge, p. 271.
 1943. Scortecchi, p. 270.
 1950. Ionides, p. 101.
 1950. Rose, pp. 271, 320.
 1955. Rose, pp. 93, 97 (faulty key).
 1902b. *Chlorophis natalensis* Boulenger (not Smith), p. 17.
 1910b. Boulenger (part), p. 507 (Kafue River record only).
 1948a. FitzSimons, V. F., p. 73, pl. i, fig. 1.
 1933m. *Philothamnus dorsalis* Witte (part, not Bocage), p. 89.

Further citations of "hoplogaster" and "neglectus" will be found under *macrops*, *i. battersbyi*, *i. ornatus*, *i. irregularis* and *heterolepidotos*.

Common Names. Southeastern Green-Snake (Loveridge); Green Water-Snake (FitzSimons); Leaf-Snake (Cott); *imbindi-pidni* (Nyakusa:Loveridge); *masamandimo* (Sena:Cott); *nal-winduwindu* (Misuku:Loveridge); *namalanga* (Makonde:Loveridge); *namasamba* (Nyanja, but not even generic); *nyaluwina* (Hehe:Loveridge); *nyoka amani* (Sambaa:Loveridge); *nyoka msipu* (Chewa; Ngoni:Loveridge).

Description. Preoculars 1, rarely 2; postoculars 2, rarely 3; temporals 1 + 1, rarely 1 + 0, 1 + 2, 2 + 1 or 2 + 2; upper labials 7-9, the fourth and fifth, rarely the third and fourth, the third, fourth and fifth, the fourth, fifth and sixth, or the fifth and sixth, entering the orbit; lower labials 9-11, rarely 13.⁶⁷ the first 4, 5, or 6 in contact with the anterior sublinguals. Mid-body scale-rows 15, very rarely 13 or 14⁶⁸; ventrals 130⁶⁹ or 141-164 (♂♂ 141-160⁷⁰; ♀♀ 143-164); anal divided; subcaudals 73-106 (♀♀ 73-98⁷¹; ♂♂ 87-106).

⁶⁷ Thirteen on one side only of a Nyange snake (M.C.Z. 23208).

⁶⁸ Thirteen on a Fort Johnston ♀; 14 on a Zomba ♀ (Loveridge:1953h).

⁶⁹ 130 on an aberrant Rungwe reptile recorded and verified by Bogert (1940:54); 141 is the lowest count for 30 ♂♂ in the Museum of Comparative Zoology.

⁷⁰ 161-163 (Laurent:1956) and 173 given by de Witte (1953:183) requires checking, as do his low subcaudal counts (♀♀ 59-88; ♂♂ 78-105) which may be due to inclusion of specimens with regenerated tail tips.

⁷¹ 98 in a Mazoe snake (B.M. 02.2.12.87), and 91, not 93, in one ♀ cotype.

For characters common to all species, and synopsis of scale-counts, see pp. 49-52, 55.

Color. Above green, the interstitial skin black, uniform, or nape and anterior part of back with a longitudinal series of paired black, blue (at Iloilo), or brown (in life at Lake Rutamba) spots, that sometimes coalesce to form crossbars; some scales with a white basal spot. Below, pure white to very pale green.

Seven black crossbars on a young snake, found in a heap of debris beneath a mango tree at Mikindani, gave it some resemblance to a young night-adder (*Causus resimus*). F. W. Fitz-Simons (1912) remarks that where they occur together, green-snakes are apt to be mistaken for the young of the Green Mamba (*Dendroaspis angusticeps*).

Size. Length of cotype ♂ (Brit. Mus.), 650 (432 + 218⁷²) mm. from Durban; exceeded by a ♂ (M.C.Z. 51101), 720 (500 + 220) mm. from the Misuku Mountains, and, if sex and determination are correct, one of 821 (638 + 183) mm. recorded by de Witte. Largest ♀ (B.M. 02.2.12.87), 945 (685 + 260) mm. from Mazoe (measured by me).

Remarks. *C. hoplogaster* of Boulenger (1894a) was a composite of true *hoplogaster* and a northern form from which *hoplogaster* was probably derived — for they are separable only on subcaudal counts and relative tail lengths. *C. neglectus* of Boulenger (1894a) was likewise a composite of the same two reptiles, for Boulenger separated his “*neglectus*,” whose ventrals were more or less distinctly keeled, from his “*hoplogaster*,” in which there were no trace of keels. Actually every gradation in this character is to be found throughout the range of both snakes. In recent times Bogert (1940) was the first to point out that *neglectus* Peters is indistinguishable from *hoplogaster* Günther.

The type of *oldhami*, whose ventral and subcaudal counts are unknown, is no longer in the collection of the Indian Museum as I am informed by its Director; neither can it be found in the British Museum, says Mr. J. C. Battersby. Dr. V. Fitz-Simons concurs (letter of 4.xii.50) in the assignment of his (1948a) “*natalensis*” from the Drakensberg, to *hoplogaster*.

⁷² Not 228 by my measuring (A.L.).

Dentition. Maxillary teeth numbered 27 in two Rungwe snakes examined by Bogert (1940); apparently 25 and 26 respectively in skulls from Lake Rutamba and Ujiji studied by me, the last few teeth being enlarged.

Hemipenis. Not bifurcate; sulcus spermaticus undivided; basal spines large, merging on the middle third into reticulate calyces which grade into papillae towards the tip, which extends to the eighth caudal (Bogert).

Sexual dimorphism. Negligible, owing to the considerable overlap in the number of subcaudals, though there is undoubtedly an average difference.

Breeding. On March 3, at Mwaya, a ♀ held 5 eggs about 28 x 8 mm.

On October 1, at Nyange, a ♀ held 6 eggs about 20 x 7 mm.
Between October 9-29, at Vituri, a ♀ held 3 eggs about 34 x 10 mm.

On December 18, at Chitala, a ♀ held 6 eggs about 20 x 28 mm.

On February 12, at Chowe, a hatchling measured over 193 (140 + 53) mm. It is possible that the Vituri snake had already laid some of her clutch. Günther (1894a), without giving a date, mentions 5 eggs as ready for extrusion by a Shire Highlands snake.

Diet. Lizards and frogs. More specifically, a gecko (*Hemidactylus persimilis*) in the stomach of a Bagamoyo specimen; at Dar es Salaam I watched a captive snake take a gecko (*Lygodactylus p. picturatus*); FitzSimons (1939b) notes a Chirinda Forest reptile had eaten a gecko (*L. capensis*) and frog (*Arthroleptis s. stenodactylus*); several frogs of this same race were in Kitaya snakes, and I caught a Bagilo snake with an *A. s. whytii* in its mouth, recovered a second *whytii* from a Vituri specimen; and a third *whytii* at Iloilo; *A. reichei* at Kigogo; three out of four captive green snakes died after making heavy meals of *Rana m. mascareniensis*. A Nyange snake held a frog, a buprestid beetle and a grasshopper, with the possibility that digestion might have released the insects from the frog's stomach.

Parasites. Immature encysted worms (*Acanthocephala* sp.) were present on the outer wall of the intestinal tract of a Bagilo snake which held an adult ♀; several Nyange snakes, infested with subdermal cysts, died a few days after being brought in by natives; Vituri specimens were also parasitized.

Enemies. One, at least, was eaten by a *Thelotornis k. kirtlandii* that at first shared the vivarium with some green snakes.

Aestivation. At the height of the dry season Neave dug one from a termitarium on the bank of the Loangwa River, at which time the ground "was so hard that it could hardly have entered except during the previous rains" (Boulenger, 1907a).

Habitat. Southeastern Green-Snakes are very adaptable, being found on the coastal plain, upland savanna, or montane forest, their distribution being governed by conditions sufficiently moist to support the frogs on which they subsist. Consequently they frequent marshes, ponds, and rivers, being as adept at swimming as they are at climbing. F. W. FitzSimons (1912) remarks that when a frog is captured in the water, the snake swims ashore and glides up the bank carrying its prey well off the ground. I (A.L.) found one on the thatch of a watcher's hut in a rice swamp, and many on the fringe of, or in clearings in, rain forest. According to Cott (1935) they abound among the borasus palms near the mouth of the Zambezi.

Localities. **Tanganyika Territory:** *Amboni near Tanga; *Bagamoyo; *Dar es Salaam; *Ilo; Kibongoto (Kibonoto); Kili-manjaro Mtn.; *Kilwa; *Kitaya; Kitopeni; *Lake Rutamba; *Liwale; *Magrotto Mtn.; Marangu; *Mikindani *Morogoro; *Mwaya; *Nehingidi; Rungwe Mtn.; *Ruponda; Tanga; Tukuyu (as Langenburg) *Tunduru; Uhehe; *Ujiji; *Uluguru Mtns.—*Bagilo—*Nyange—*Vituri; Uzungwe Mtns.—*Kigogo; Wanga (as Wange). **Zanzibar:** Mafia Id. only. **Mozambique:** Beira; Boror (as Prazo Boror); Caia; Charre; Fambani; Jeowesa; Lourenco Marques; Mozambique; Quilimane. **Nyasaland:** *Chitala River; *Cholo Mtn.; *Chowe; *Fort Johnston; Karonga; Mandala Hill, Blantyre; *Misuku Mtns.; Mlanje Mtn.—*Ruo River; *Nehenaehena; *Nehisi Mtn.; Shire Highlands; *Zomba Mtn. **Belgian Congo**⁷³: Bukena; Elizabethville; Ganza; Inkan-

⁷³ Lukafu being the only Congo locality from which I have seen a specimen, all but 2 of the remaining 42 are based on identifications by de Witte (1953), whose report should be consulted for more precise locality data.

gala; Kabenga; Kabwe; Kakyelo on Luombwa River; Kalule-North River; Kamina; Kande River; Kankala River; Kanonga River; Kanzenze; Kapiri; Kateke River; Katentania; Kaswabilinge; Kilwezi River; Kimiala River; Lofoi; Lubumbashi; *Lukafu; Lukima River; Lukonzolwa; Lukuga-Niamba confluence; Lupiala River; Lusinga; Mabwe, Lake Upemba; Mpala; Munoi; Musosa; Ngayu; Nyonga; Nyunzu; Panda; Sakania; Sandoa; Sanga River; Senze River; Seram Station. **Belgian Ruanda-Urundi:** Mosso Camp, Rutana Territory. **Northern Rhodesia:** Boruma (as Boroma, Zambezi:1898); Broken Hill, Kafue River; Kazungula; Loangwa River; Lungasa; Luapula River; Macubu; Mashie's; Mterize River; Namaliya's; Upper Zambezi River; Victoria Falls; Zambezi Plains. **Southern Rhodesia:** *Chirinda Forest; *Mazoe; *Rietfontein; Salisbury⁷⁴; Vumba Mtn. **Transvaal:** Barberton; Lydenburg; Middleburg; *Pretoria; *Pretoria West. **Natal:** Drakensberg; *Durban; Lower Illovo River; Merebank; Mseleni, Zululand; Port Natal = Durban (type locality); Ubombo; *Umvoti River; Vryheid. **Cape Province:** "Cape Colony"; East London; Knysna; Orange River; Pondoland; Port Elizabeth; Port St. Johns.⁷⁵

Range. East Africa south of about 5° S., i.e. south of the Usambara Mountains, Tanganyika Territory, south to Durban, Natal, west to Port Elizabeth, Cape Province, and north through the Rhodesias to the eastern Belgian Congo.

PHILOTHAMNUS IRREGULARIS BATTERSBYI Loveridge

- 1878a. *Philothamnus hoplogaster* Peters (not Günther), p. 206.
 1892. *Philothamnus neglectus* Matschie (not Peters), p. 110.
 1893. Pfeffer (part), p. 84 (omit Quilimane).
 1894a. *Chlorophis hoplogaster* Boulenger (part; not Günther), p. 93 (Victoria Nyanza only).
 1896. Tornier, p. 69.
 1897a. Tornier, p. 69 (reprinted).

⁷⁴ Identification checked by Dr. Walter Rose. More recently D. C. Broadley writes me (20.ix.56) that he has collected examples of both *hoplogaster* and *i. irregularis* at Salisbury; both species have also been reported as occurring in Chirinda Forest.

⁷⁵ The Wynberg record of Boulenger (1910b) is obviously erroneous, for *hoplogaster* does not occur in western Cape Province. Evidently Boulenger never saw the specimen on which the record was based, for W. Rose informs me (9.xi.56) that it is an example of *Hemirhagerrhis nototaenia*.

- 1897b. Tornier, p. 65.
1902d. Boulenger, p. 446.
1910b. Boulenger (part), p. 507 (part key & range).
1910a. Sternfeld, p. 18 (Bukoba).
1912. FitzSimons, F. W. (part), pp. 86, 87, 92 (part key & range).
1916a. Loveridge, pp. 78, 84.
1918a. Loveridge, pp. 333.
1924b. Loveridge, p. 5.
1929. Hecht (part), p. 332 (part key & range).
1929h. Loveridge, p. 22.
1929a. Werner (part), p. 100 (part key & range).
1933h. Loveridge (part), p. 236 (omit Tanganyika localities).
1936j. Loveridge, p. 245.
1936. Pitman, p. 275.
1938a. Pitman, p. 305.
1939a. Scortecchi, p. 274.
1942b. Bogert, p. 2.
1942e. Loveridge, p. 271.
1894a. *Chlorophis neglectus* Boulenger (part; not Peters), p. 94 (Lamu; Mkonumbi; and Teita in Kenya; Zanzibar Coast).
1894e. Günther, p. 88.
1895. Günther, p. 527.
1896a. Boulenger, p. 553.
1896d. Boulenger (part), p. 631 (omit Nyasaland localities).
1896. Tornier, p. 69.
1897a. Tornier, p. 69 (reprinted).
1908c. Sternfeld, p. 240.
1908e. Sternfeld, p. 243.
1909a. Boulenger, p. 193.
1910b. Boulenger (part), p. 507 (part key & range).
1910a. Sternfeld (part), p. 18 (Kagera).
1910. Meek, p. 406.
1911. Lampe, p. 193.
1911. Lönnberg, p. 23.
1911b. Nieden, p. 442.
1912. FitzSimons, F. W. (part), p. 86 (part key & range).
1912. Hobley, p. 48.
1913. Lönnberg & Anderson, p. 4.
1916a. Loveridge, pp. 79, 84.
1916b. Loveridge, p. 118.
1917b. Loveridge, p. 180.
1918a. Loveridge, p. 332.
1923a. Loveridge, p. 26.

- 1923e. Loveridge, p. 878.
 1924b. Loveridge, p. 5.
 1925a. Calabresi, p. 106 (as *Chlorophis*).
 1925a. Angel, p. 32.
 1927. Calabresi, p. 53 (as *Chlorophis*).
 1928e. Barbour & Loveridge (part), p. 115 (Usambara locs. & data).
 1929. Hecht (part), pp. 332, 333 (part key & range).
 1929h. Loveridge, p. 22.
 1929a. Werner (part), p. 100 (part key & range).
 1934e. Mertens, p. 169.
 1936h. Loveridge, p. 30.
 1936j. Loveridge, p. 246.
 1936. Pitman, p. 276, pl. v, fig. 3; pl. E., fig. 5.
 1937f. Loveridge, pp. 489, 493, 496, 503.
 1937. Uthmüller, p. 108 (omit range).
 1938a. Pitman, p. 305.
 1938b. Pitman, pp. 89, 90, 305 (reprinted, pls. as in 1936).
 1938. Uthmüller, p. 43.
 1941a. Uthmüller, p. 26.
 1941b. Uthmüller, p. 233.
 1946a. Loveridge, pp. 97, 108.
 1918. *Philothamnus semivariegatus* Calabresi (not Smith), p. 124.
 1929h. *Chlorophis* sp. Loveridge, p. 23.
 1946. Blom-Björner, 1945, p. 159.
 1948. "Green Grass Snake" Kingdon, p. 10.
 1949a. *Chlorophis irregularis hoplogaster* Parker (not Günther), p. 61.
 1951a. *Chlorophis irregularis battersbyi* Loveridge, Bull. Mus. Comp. Zool.,
 106, p. 190: Sipi Forest at 6,000 feet, Mount Elgon, eastern
 Uganda
 1951c. Loveridge, pp. 4, 7.

Common Names. Northeastern Green-Snake (English); *emun* (Karamojong); *homboka* (Pokomo); *naranyase* (Gishu); *new-andegala* (Ganda).

Description. Preoculars 1, rarely 2⁷⁶; postoculars 2, rarely 3⁷⁷; temporals 1 + 1 or 1 + 2, rarely 1 + 3⁷⁸ or 2 + 2⁷⁹; upper

⁷⁶ Two in two Kaimosi snakes (M.C.Z. 40501; 40504).

⁷⁷ Three in a Butandiga snake (M.C.Z. 40492), while the lower postocular is fused with the fifth labial on one side of a Naivasha snake (U.S.N.M. 41701).

⁷⁸ On one side of a Sanya snake (*vide* Uthmüller:1938).

⁷⁹ On one side of a Butandiga snake (M.C.Z. 40489).

labials 7-9,⁸⁰ rarely the third and fourth, usually the fourth and fifth, occasionally the fifth and sixth, entering the orbit; lower labials 8-11, the first four, five or six in contact with the anterior sublinguals; midbody scale rows 15; ventrals 147-177 (♂♂ 147-169; ♀♀ 153-177); anal divided, rarely entire⁸¹; subcaudals 90-120 (♀♀ 90-111; ♂♂ 100-120).

For characters common to all species, and synopsis of scale counts, see pp. 49-52, 55.

Color. Above, pale or dark green, the interstitial skin black; some scales with a white basal spot, others with or without black edging. Below, chin and throat white; remainder white, yellowish, or pale green.

Size. Length of ♂ (M.C.Z. 40172) 841 (588 + 253) mm., and ♀ (M.C.Z. 40155) 1045 (762 + 283) mm., both from Sipi, Mt. Elgon.

Remarks. It will be noted that this northeastern race of *irregularis* usually attains to a greater length than does the southern *hoplogaster*, with which it has long been confounded. Thus for a *hoplogaster* ♂ the maximum is 720 mm., for a ♀ 945 mm., while for an *irregularis battersbyi* ♂ the maximum is 841 mm., for a ♀ 1045 mm.

Though the northeastern *battersbyi* has so long been confused with *hoplogaster* (Günther) or its synonym *neglectus* (Peters), with which it agrees in the number of labials entering the orbit, and to which it presumably gave rise, when sexed it may be distinguished as follows:

Subcaudals in ♀♀ 73-98, in ♂♂ 87-106; range: Eastern Congo and East Africa from the Usambara Mountains, south through the Rhodesias and Mozambique to Natal *hoplogaster*

Subcaudals in ♀♀ 90-111, in ♂♂ 100-120; range: East Africa from the Usambara Mountains north through Kenya to Ethiopia, west to the Nile and Uganda where it merges with typical *irregularis*

. *i. battersbyi*

⁸⁰ 7 Labials, 3 & 4 entering on both sides (Nairobi: U.S.N.M. 49007). 7 labials, 4 & 5, entering on 1 side (Nairobi: U.S.N.M. 40985). 8 labials, 4 & 5 entering on 205 sides. 8 labials, 5 & 6 entering on 1 side (Nairobi: U.S.N.M. 40985). 9 labials, 5 & 6 entering on 29 sides.

⁸¹ Entire in a Naivasha snake (U.S.N.M. 41701).

From typical *irregularis* it is separable only on the upper labials as follows:

Two labials (rarely the 3rd and 4th, normally the 4th and 5th, occasionally the 5th and 6th) enter the orbit in all northeastern material	<i>i. battersbyi</i>
Usually 3 labials (rarely 3rd, 4th and 5th, normally 4th, 5th and 6th, rarely the 5th, 6th and 7th) but occasionally (chiefly among Angolan snakes and not more than 5% of the West African population) only 2 labials (the 4th and 5th, or 5th and 6th) enter the orbit	<i>i. irregularis</i>

The snake from Gelib and Margherita referred to by Calabresi (1918) as a ♂ "*semivariiegatus*" cannot be that species if the low ventral count is correct. It does agree in both ventrals (155) and subcaudals (90) with ♀ *i. battersbyi*, but if a ♂ the tail must be truncated.

Notes on labial variation, based on other material, will be found in Loveridge (1936j, p. 245).

Sexual dimorphism. Reference to the description (*vide supra*) reveals only a slight average difference in the number of subcaudals as between the sexes.

Breeding. More than a dozen detailed records will be found under "*hoplogaster*" and "*neglectus*" in Loveridge (1936j, pp. 246-247). These, together with earlier records, would seem to indicate that in Uganda and western Kenya, from 4 to 8 eggs are laid towards the end of the lesser (November-December) or greater (February-March) rains, but that in the coastal belt of Kenya eggs are ready for laying about June. The single record of July 16 from Ukerewe Island, Lake Victoria, where only 2 eggs (measuring 29 x 8 mm.) were in the oviducts of a large female, suggests that other eggs of the series had been deposited already.

Diet. At various times I have recorded stomach contents comprising the following lizards: *Cnemaspis a. elongensis*; *Chamaeleo b. hoehneltii*; *Mabuya s. striata*; *Ablepharus wahlbergii* and *Lacerta jacksoni*, and frogs: *Rana a. edulis*, *R. o. gribinguiensis* and *Hyperolius rossii*, sometimes several examples in one snake, at other times several snakes having swallowed the same species.

An interesting account of a struggle between a "vivid green grass snake" and a five-or-six-inch catfish (*Amphilius*) has been

furnished by Major J. Kingdon (1948). He was near Thego Ford, Nyeri Station, when his attention was attracted by a violent commotion in a shallow water furrow above whose surface waved the coils of a snake. As Kingdon approached the spot, the reptile pulled the fish from the runnel and started with it across the river. On reaching deeper water, however, the fish took control and the combatants were carried down stream to shallower water where the snake regained the advantage and, by entwining among the rocks, succeeded, though only with a great effort, in dragging the *Amphilius* along. Both appeared exhausted by the struggle, especially the snake, which was periodically submerged by the weight of its prey. Eventually the fish, by diving among sunken twigs, achieved its freedom and swam off down the runnel.

Parasites. An immature ascarid in a Nairobi snake (Loveridge:1923e), others encysted in the stomach wall of a Kaimosi reptile (1936j).

Enemies. I recovered one of these green-snakes from the stomach of a harrier-eagle (*Circactus g. gallicus*) shot at the foot of Mt. Debasien, while two others were taken from the crop of a *C. cinerascens* by Blom-Bjorner (1946).

Temperament. One of a pair of green snakes that I caught bit sufficiently hard to draw blood (1917b).

Habits. Two, basking on bushes overhanging Nairobi River, escaped by dropping off into the water (1916b).

Habitat. One was resting on a lily pad far out in a swamp where it was probably hunting frogs; in this same flooded area another was associated with two Variegated Bush-Snakes (*Philothamnus s. semivariiegatus*) in a small doom palm. While this was on the coastal plain, *battersbyi* is as much at home on upland savanna or montane forest-edge. As a variation of its usual habitat, one put its head out of a leather hairbrush-case on a Nairobi dressing table that it had reached through an open casement.

Uthmüller (1941b) believed that this and certain other snakes actually thrive and multiply when land is cleared for the cultivation of bananas, coffee or maize, and disappear when the plantations revert to bush. I would suggest that their apparent prev-

alence in cultivated areas is due to the reptiles being more readily seen and killed by the numerous Africans employed about a plantation.

Localities. **Sudan:** *Torit. **Ethiopia:** Abbai (? Lake Abaya. Taneredi Expedition to Lake Tana); Addis Ababa; Gadat, Gofa; Gondar; Guder; Let Marefia, Shoa. **Somalia:** Belet Amin; possibly Gelib and Margherita, west of Juba River (if the "*semi-variegatus*" of Calabresi is *battersbyi*); Kismayu. **Uganda:** Kagera; Mabira Forest—*Mubango; *Mt. Debasien; *Mt. Elgon—*Butandiga, *Sipi; *Ntenjeru near Sesibwa River. **Kenya Colony:** *Athi River; *Fort Hall; *Juja; Kabete; *Kaimosi, Kakamega (Kakumega); *Kau; Kavirondo; Kenya Mtn.; *Kenya Province; Kibwezi; *Kijabe; *Kirui's Village; Kitui; *Lake Elmenteita; Lake Naivasha; *Lake Peccatoni; Lamu; Masai Reserve; Meru Boma; *Mkonumbi; Mtito Andei; *Nairobi; Nakuru; *Ngatana; Nyeri Station; Teita; Thika; Tumutumumu; *Voi; Wambugu; *Witu; Yala River **Tanganyika Territory:** Bukoba; Gomberi; *Ikizu; *Korogwe; Lake Victoria; Marangu; *Matembo; Sanya; *Ukerewe Id.; Usambara Mtns.—*Amani, Bulwa, *Bumbuli, Derema, Lewa, *Mlalo near Höhenfriedeberg. Nguelo; "Zanzibar Coast" (Boulenger 1894a: probably Usambara).

Range. East Africa (east of 33° E., south of 15° N., and north of 5° S.). More specifically, the Sudan (east of the Nile), east through Ethiopia to Somalia, south through Uganda and Kenya Colony to (and including) the Usambara Mountains of north-eastern Tanganyika Territory, west to Lake Victoria.

PHILOTHAMNUS IRREGULARIS ORNATUS Bocage

1872. *Philothamnus ornatus* Bocage, Journ. Sci. Lisboa, 4. p. 80: Huilla, Angola (restricted by Bogert:1940).
 1882c. Bocage, p. 15, fig. 6.
 1884b. Sauvage, p. 201 (as *Philothalmus* in French Congo list).
 1895a. Bocage, p. 93, pl. xii, figs. 1a-c.
 1896a. Bocage, p. 78.
 1897a. Bocage, p. 200.
 1894a. *Chlorophis ornatus* Boulenger, p. 93.
 1896d. Boulenger, p. 631.
 1905c. Boulenger, p. 112.

- 1915a. Boulenger, p. 205.
 1919a. Boulenger, p. 281.
 1921a. Angel, p. 42.
 1929. Hecht, p. 332.
 1929a. Werner, p. 100.
 1931. Monard, p. 103.
 1933f. Angel, p. 109.
 1937b. Monard, pp. 113, 119.
 1940. Bogert, p. 51.
 1940b. Monard, p. 148.
 1950b. Villiers, p. 80.
 1937b. *Chlorophis hoplogaster* Monard (not Günther), pp. 114, 120.
 1951e. *Philothamnus irregularis ornatus* Loveridge, pp. 4, 8.

A further citation of "*ornatus*" will be found under *heterolepidotus*.

Common Name. Ornate Green-Snake (Loveridge).

Description. Preocular 1; postoculars 2; temporals 1 + 1, rarely 1 + 2⁸²; upper labials 8-10, the third and fourth, normally the third, fourth and fifth, rarely fourth and fifth, or fourth, fifth and sixth, entering the orbit; lower labials 10, the first 5 or 6 in contact with the anterior sublinguals. Midbody scale-rows 15; ventrals 150-166 (δ 150; ♀ 160-161); anal divided; subcaudals 85-106 (♀ 99; δ 106).

For characters common to all species, and synopsis of scale-counts, see pp. 49-52, 55.

Color. Above, iridescent green or bronze green, the interstitial skin black, a few scattered black spots on the nape and a broad, usually yellow-edged, chocolate-brown, vertebral band extending from head to end of tail; this band occupies the median series of dorsal scales and encroaches on those on either side; a few scales may be flecked with white. Below, yellowish cream, uniform, or the posterior margins of some ventrals brownish; tail greenish.

Size. Length of δ (A.M.N.H. 51772) 610 (405 + 205) mm.; larger ♀ (P.M. 20-100) 693 (480 + 213) mm., both surpassed by an unsexed cotype (Bocage) of 710 (510 + 200) mm.

Remarks. *P. i. ornatus* is apparently separable from typical *irregularis* only by its striking coloration, which resembles that

⁸² Only in the Bimbi snake referred to "*hoplogaster*" by Monard (1937b).

of the perfectly distinct *Philothamnus s. dorsalis* Bocage of the same general region. *P. i. ornatus* occupies a fairly well-defined area in southwestern Angola where it is partly surrounded by typical *irregularis* as it approaches the limits of its range in the southwest.

Possibly undue emphasis has been laid on the striking coloration of *ornatus* and a more representative southwestern race of *irregularis* would embrace all Angolan material possessing a low number of ventrals and subcaudals. This point could be settled by someone assembling all available Angolan material of the genus.

I have seen the specimen of *ornatus* recorded from neighboring Northern Rhodesia by Angel, but the alleged "*ornatus*" from the Congo proved on examination to be a misidentified *heterolepidotus*. I also would question Sauvage's listing of it from the French Congo, though it may indicate the recrudescence of a recessive pigmentation.

Bocage himself (1872) listed one of his three eotypes as coming from Cacheu (Cachéo), a river and bay in northern Portuguese Guinea. Later (1896a) he gives Bissau as the type locality in his list of types from Portuguese Guinea in the Lisbon Museum. I am inclined to suspect an error in labeling, for in a later list Bocage returns to Cacheu. Probably the specimen originally came from Angola, from which country 10 specimens are now known, justifying Bogert's (1940) action in restricting the type locality to Huilla, from whence we have a cotype. There is but a single example of *ornatus* in the British Museum.

Dentition. Maxillary teeth 26, slightly increasing in size posteriorly (Bogert).

Hemipenis. Not bifurcate; sulcus spermaticus undivided; basal spines large, blunt, merging into 6 flounees which occupy the middle third; passing on the terminal third into reticulate calyces which grade into papillae towards the tip, which extends to the eighth caudal (Bogert).

Localities. **Angola:** Benguela to Bihe; Bimbi; Caconda; Cahuquembe (Kalukembe); Chimporo; Cunene; Cutato (Kutatu); Huambo; *Huilla. **Northern Rhodesia:** *Lealui (Lialui).⁸³

Range. Southwestern Northern Rhodesia west to southwestern Angola.⁸³

⁸³ See Remarks regarding its listing from **French Congo** by Sauvage (1884) and **Portuguese Guinea:** Cacheu (Bocage:1872).

PHILOTHAMNUS IRREGULARIS IRREGULARIS (Leach)

Series I. Mostly typical, having 3 labials entering the orbit.

1789. *C(oluber) Caeruleus* Lacépède (not Linnaeus, 1758, p. 218, No. 189),
Hist. nat. Serpens, 2, pp. 100, 276: Cap Vert.
- 1803e. *Coluber caeruleseens* Daudin (not Linnaeus, 1758, p. 227, No. 385),
Hist. nat. Rept., 7, p. 54: new name for *caeruleus* Lacépède from
"Cap Verd."
1818. *Coluber caesius* Cloquet, Diet. Sci. nat. (Paris), 11, p. 201: new name
for *caeruleus* Lacépède (Suppressed: cf. *Remarks*).
1819. *Coluber irregularis* Leach, in Bowdich, Miss. Ashantee, p. 494:
Fantee, Gold Coast.
1840. *Dendrophis (Philothamnus) albo-variata* A. Smith, Ill. Zool. S.
Africa, Rept., pl. lxiv, figs. 3-3b; pl. lxv: South Africa towards
Tropic of Capricorn (also Ghana; Sierra Leone; Gambia).
1843. *Dendrophis Chenonii* Reinhardt, Dansk. Vidensk. Selsk. Skrift, 10,
p. 246, pl. i, figs. 13-14: Guinea.
- 1854a. *Leptophis Chenonii* Duméril & Bibron, 7, p. 545.
1860. Duméril, A., p. 199.
- 1866a. Bocage, p. 48.
1881. Jan, pl. i, fig. 2.
1858. *Ahaetulla irregularis* Günther (part), p. 152.
- 1863e. Günther, p. 285.
1874. Reichenow, p. 292.
- 1882b. Müller, p. 169.
1885. Müller, p. 683.
1893. Günther, p. 555.
1898. Johnston, p. 361a.
- 1867b. *Philothamnus albovariatus* Peters, p. 236.
- 1882c. Bocage, p. 19.
- 1875a. *Philothamnus irregularis* var. *longifrenatus* Buchholz & Peters,
Monatsb. Akad. Wiss. Berlin, p. 199: Cameroon.
- 1877c. *Philothamnus irregularis* Peters, pp. 615, 620.
- 1881b. Boettger, p. 396.
- 1881d. Peters, p. 149.
- 1882c. Bocage, pp. 3-4, fig. 1.
- 1884a. Rochebrune, p. 172 (ignored).
- 1887a. Bocage, p. 205.
- 1888a. Boettger, p. 61.
1890. Büttikofer, p. 446.
- 1895a. Bocage (? part), p. 85, pl. xii, figs. 2a-2c (? *angolensis*).
- 1896a. Bocage, pp. 78, 92.

- 1896b. Bocage, p. 112.
 1896e. Bocage, p. 176.
 1905. Ferreira, p. 167.
 1952b. Villiers, p. 888.
 1954d. Laurent, p. 305.
 1885. *Ahaetulla (Leptophis) fraenata* Müller, p. 684 (? lapsus: not *A. frenatus* Günther which = *Uromacer frenatus* of Haiti).
 1888a. *Ahaetulla emini* Günther, Ann. Mag. Nat. Hist., (6) 1. p. 51: "Monbuttu," = Mangbetu Belgian Congo.
 1888b. Günther, p. 325.
 1888b. *Ahaetulla shirana* Günther, Ann. Mag. Nat. Hist., (6) 1. p. 326: Blantyre Mission, Shire River, Nyasaland.
 ?1893. *Philothamnus Güntheri* Pfeffer, Jahrb. Hamburg. Wiss. Anst., 10. p. 85, pl. i, figs. 3-5: Quilimane, Mozambique.
 1905. Ferreira, p. 168 (Angola).
 1895. *Chlorophis Güntheri* Günther, p. 528 (key).
 1895. *Chlorophis shirana* Günther, p. 528 (key).
 1891a. *Chlorophis irregularis* Boulenger, p. 306.
 1894a. Boulenger (part), p. 96 (omit locality Ugogo).
 1895. Günther, p. 528.
 1896d. Boulenger, p. 631.
 1896b. Mocquard, p. 45.
 1896c. Mocquard, p. 59.
 1896. Peracca, p. 2.
 1896. Tornier, p. 70, fig. D.
 1897b. Boulenger, p. 278.
 1897e. Boulenger, p. 801.
 1897. Sjostedt, p. 35.
 1897. Tornier, p. 65.
 1897b. Werner, p. 398.
 1898. Boettger, p. 58.
 1898. Johnston, p. 361a.
 1898. Selater, p. 99.
 1898a. Werner, p. 209.
 1899a. Werner, pp. 147, 149.
 1900b. Boulenger, p. 452.
 1902d. Boulenger, p. 446.
 1902a. Werner, pp. 334, 344.
 1903a. Ferreira, p. 10.
 1905c. Boulenger, p. 112.
 1906i. Boulenger, p. 213.
 1908a. Sternfeld (part), p. 425 (omit Bipindi).
 1908b. Sternfeld, pp. 214, 230.

- 1909a. Chubb, p. 595.
1909b. Chubb, p. 35.
1909. Gendre, p. evi.
1909. Peracca, p. 172.
1909a. Sternfeld, p. 14.
1909b. Sternfeld, p. 15.
1910b. Boulenger, p. 508.
1910a. Sternfeld (part), p. 19 (omit Ugogo).
1910d. Sternfeld, p. 64.
1911e. Boulenger, p. 165.
1911. Lepri, p. 324.
1912. FitzSimons, F. W., p. 87.
1912b. Sternfeld, p. 384.
1912e. Sternfeld, p. 270.
1915a. Boulenger, p. 205.
1915e. Boulenger, p. 623.
1916f. Chabanaud, p. 371.
1917b. Chabanaud, p. 11.
1917. Sternfeld, p. 468.
1919a. Boulenger, p. 282.
1921a. Angel, p. 42.
1921a. Chabanaud, p. 468.
1921b. Chabanaud, p. 524.
1922. Aylmer, p. 15.
1923e. Loveridge, p. 878.
1923. Schmidt, p. 76.
1927. Calabresi, p. 53.
1927d. Witte, p. 323.
1928. Cott, p. 953.
1929. Flower, p. 203.
1929. Hecht, pp. 331, 334.
1929a. Werner, p. 101.
1930a. Barbour & Loveridge, p. 772.
1931. Monard, p. 104.
1932a. Parker, p. 219.
1933f. Angel, p. 108.
1933. Flower, p. 806.
1933. Schouteden, p. 236.
1933m. Witte, p. 89.
1934e. Mertens, p. 169.
1934. Pitman, p. 294.
1934a. Schwetz, pp. 380, 383.
1934b. Schwetz, supp. p. (24).

- 1935a. Corkill (part), p. 17 (part *heterolepidotus*).
 1935. Cott, p. 966.
 1936h. Loveridge, p. 30 (part *heterolepidotus*).
 1936j. Loveridge (part), p. 247 (omit Kaimosi specimens).
 1936e. Parker, p. 125.
 1936. Pitman, p. 278, pl. v, fig. 5, pl. E, fig. 3.
 1937a. FitzSimons, V. F., p. 273.
 1937c. Loveridge (part), p. 273.
 1937f. Loveridge, pp. 489, 496, 503.
 1937b. Monard (part), pp. 114, 121 (tentatively omitting *angolensis*).
 1938e. Mertens, p. 439.
 1938a. Pitman, pp. 306, 328.
 1938b. Pitman, pp. 23, 39, 87, 91-93, 98, 294, 306, 328 (reprinted).
 1939b. FitzSimons, V. F., p. 22.
 1940. Bogert (? part), p. 53 (? omit one of Capelongo series).
 1940b. Monard, p. 175.
 1941. Themido, pp. 4, 10.
 1941. Witte (part), pp. 184-198 (part *heterolepidotus*).
 1942e. Loveridge, p. 272.
 1945. Leeson, p. 1 (key).
 1950f. Laurent, p. 128.
 1950. Leeson, pp. ix, 39, 40, 66, 133, fig. 17.
 1950. Rose, p. 272.
 1950b. Villiers, p. 81, figs. 96-97.
 1951. Monard, p. 149.
 1955. Rose, pp. 93, 97 (faulty key).
 1894a. *Chlorophis emini* Boulenger (part), p. 92, pl. v, fig. 1 (omit Sudan specimens which are *heterolepidotus*).
 1895. Günther, p. 528 (key only).
 1900. Flower, p. 968.
 1902d. Boulenger, p. 446.
 1908c. Boulenger, p. 5.
 1908a. Sternfeld, pp. 407, 424.
 1908. Werner (1907), p. 1871.
 1909b. Boulenger, p. 303.
 1909g. Boulenger, p. 246.
 1909b. Sternfeld, p. 15.
 1910. Peracca, p. 4.
 1910. Roux, p. 99.
 1910a. Sternfeld, p. 18, fig. 17.
 1911e. Boulenger, p. 165.
 1912c. Sternfeld, p. 268.
 1915a. Boulenger, p. 204.

- 1915c. Boulenger, p. 622.
1915d. Boulenger, p. 648.
1916f. Chabanaud, p. 371.
1917b. Chabanaud, p. 11.
1917a. Phisalix, p. 334.
1922a. Angel, p. 39.
1929. Hecht, pp. 332, 333.
1929. Pitman, p. 145.
1929a. Werner, p. 100.
1933h. Loveridge, p. 236.
1933. Schouteden, p. 236.
1933j. Witte, p. 123.
1933m. Witte (part), p. 88 (omit Elisabethville and Kanzenze).
1934e. Mertens, p. 155.
1935a. Corkill (part), p. 16.
1939. Brien, p. 130.
1892a. *Philothamnus irregularis* var. *lagoensis* Bocage (not Günther), p. 183.
1896a. *Philothamnus irregularis* var. *Güntherii* Bocage, p. 92 (Boror).
1902a. *Chlorophis heterolepidotus* Werner (part), p. 344.
1933m. Witte (part), p. 89 (Faradje and Mahagi).
1940b. Monard, p. 175 (Portuguese Guinea).
1913. *Chlorophis hoplogaster* Hewitt & Power (not Günther), p. 162.
1941. Witte, p. 184.
1923. *Chlorophis bequaerti* Schmidt (part), p. 75 (paratype ♀).
1932. *Chlorophis vernayi* FitzSimons, V. F., Ann. Transvaal Mus., 15, p. 38: Maun, Thamalkane River, British Bechuanaland.
1935b. FitzSimons, V. F., p. 132, fig. 1.
1933m. *Chlorophis heterodermus* Witte (part: not Hallowell), p. 89 (Albertville).
1941. Witte (part), p. 198 (Burunga).
1938d. *Philothamnus nitidus* Loveridge (not Günther), p. 57.
1948a. Villiers, p. 202.
1950a. Villiers, p. 62.
1950b. Villiers (part), p. 82, figs. 98-99.
1951a. Villiers, p. 822.
1954b. Villiers, p. 1240.
1946. *Philothamnus semivariegatus nitidus* Orton & Morrison (not Günther), p. 16.
1951c. *Philothamnus irregularis irregularis* Loveridge, pp. 4, 8.
1951d. Loveridge, p. 88.
1953c. Loveridge, p. 261.
1953. Witte, p. 189, fig. 55, pl. xvii, fig. 1.

1954. Angel, Guibé, Lamotte & Roy, p. 392.
 1954b. Laurent, p. 47.
 1954d. Laurent, p. 296.
 1954b. Villiers, p. 1239.
 1955. Witte, p. 216.
 1956. Laurent, p. 160, fig. 26, pl. xviii, fig. 1.
 1953. *Philothamnus hoplogaster* Witte (not Günther), fig. 52 only.
 1955a. *Chlorophis irregularis irregularis* Mertens, p. 91.

Further citations of "*irregularis*," "*emini*," and "*bequaerti*" will be found under *natalensis*, *heterolepidotus*, *s. thomensis* and *s. semivariiegatus*.

Series II. Aberrant individuals with 2 labials entering orbit.

1881. *Leptophis Chenouii* var. *albovariata* Jan (not A. Smith), No. 50, pl. i, fig. 1: (no locality mentioned).
 1881. *Leptophis Chenouii* Jan (not Duméril & Bibron), No. 50, pl. 1, figs. 3-4: (no locality mentioned).
 1882c. *Philothamnus angolensis* Bocage, Journ. Sci. Lisboa, **9**, p. 7: Capangombe, Angola.
 1897a. Bocage, p. 200.
 1884b. *Philothamnus hoplogaster* Sauvage (not Günther), p. 201 (French Congo).
 1887a. Bocage (not Günther), p. 186 (San Salvador).
 1887h. Boulenger (part), p. 176 (Damaraland only).
 1887h. *Philothamnus natalensis* Boulenger (not A. Smith), p. 176 (Damaraland only).
 1894a. Boulenger (part), p. 95.
 1910b. Sternfeld (part), p. 19.
 1894a. *Chlorophis angolensis* Boulenger, p. 95 (no material).
 1915a. Boulenger, p. 205.
 1929. Hecht, p. 333.
 1929a. Werner, p. 100.
 1937b. Monard, p. 114.
 1894a. *Chlorophis hoplogaster* Boulenger (part), p. 93 (Damaraland).
 1896b. Mocquard (as *noplogaster*, not Günther), p. 45 (Abiras).
 1910b. Sternfeld, p. 19 (Damaraland).
 1925b. Calabresi, p. 125 (Upper Uele River).
 1933m. Witte, p. 88 (Belgian Congo localities).
 1937b. Monard, p. 120 (Bimbi).
 1941. Witte, p. 184 (Belgian Congo & Ruanda localities).
 1951. Monard, pp. 150, 159.

1900. *Philothamnus irregularis* var. *angolensis* Ferreira, p. 51 (Cazengo).
 1904. Ferreira, p. 115 (Chingo).
 1908a. *Chlorophis neglectus* Sternfeld (not Peters), p. 407 (Yaunde).
 1909b. Sternfeld, p. 15 (Yaunde).
 1923d. Angel, p. 165 (nr. Loeti River, Angola).
 1933m. Witte, p. 88 (6 Belgian Congo localities).
 1937b. Monard, p. 114 (repeats Angel's record).
 1940a. Mertens, p. 241 (Kaka region, Cameroons).
 1951. Monard, p. 150.
 1908a. *Chlorophis irregularis* Sternfeld (part), p. 407 (Bipindi).
 1908. Werner (1907), p. 1871 (Hellet Nuer).
 1917. Sternfeld (? part), p. 468.
 1940. Bogert (part), p. 53 (mentions one of 4 Capelongo snakes as aberrant, correctly referring all to typical *irregularis*).

A further reference to "*angolensis*" will be found under *natalensis*.

Common Names. Irregular Green-Snake (Corkill) appears to be the most definitive of the seven names proposed by A. B. Cozens, F. W. FitzSimons, Flower and Pitman. *Bourakende* (French Guinea: Mocquard); *chilembe* (Caconda: Bocage); *emun* (Karamojong: Loveridge); *imbindipindi* (Nyakusa: Loveridge); *kalembwe-lembe* (at Dundo: Laurent); *kiango* (Casengo: Bocage); *mukangalleni* (Bakiga: Pitman); *mussola* (Ndallo-Tando: Ferreira); *nalwinduwindu* (Misuku: Loveridge); *namasamba* (Manganja: Nyanja; Yao: Loveridge); *nombo* (at Benguela & Quindumbo); *nuwandagera* (Ganda: Pitman); *rungu* (Moro Nubas: Corkill); *sensari* (Baggara Arabs: Corkill); *uango* (Quis-sange: Anchieta).

Description. Preoculars 1, rarely 2⁸⁴; postoculars 2, rarely 1, 3 or 4⁸⁵; temporals rarely 1 + 0,⁸⁶ usually 1 + 1, frequently 1 + 2, rarely 1 + 3, 2 + 1, 2 + 2⁸⁷ or 3 + 2⁸⁸; upper labials

⁸⁴ In a Mt. Debasien (M.C.Z. 40525) and a Bonthe (B.M. 50.i.1.13) snake. The head from "Mtungun, East Africa," figured by Tornier (1896:70, fig. D) with 2 pre-, 3 post-, and 2 suboculars, if not a *Thrasops j. jacksonii*, is certainly an extraordinarily aberrant individual.

⁸⁵ In a Mt. Debasien snake (M.C.Z. 40524), and on one side of a Bel Air snake (C.G. 44-1-9).

⁸⁶ On one side of a Misuku Mountains snake (M.C.Z. 51111).

⁸⁷ On one side of a Cholo Mountain snake (M.C.Z. 51123); also three Sierra Leone specimens (Brit. Mus.), a Camberene, Dakar reptile (*vide* Villiers) and a Chingo snake (*vide* Ferreira).

⁸⁸ On both side of an Achimota ♀ (C.N.H.M.).

8-10,⁸⁹ the third, fourth and fifth, or fourth and fifth, usually fourth, fifth and sixth, rarely fifth and sixth, or fifth, sixth and seventh, entering the orbit; lower labials 8-11, the first 4, 5, or 6 in contact with the anterior sublinguals. Midbody scale-rows 15; ventrals 150-183⁹⁰ (♂♂ 150-179; ♀♀ 153-183); anal divided, rarely entire⁹¹; subcaudals occasionally faintly keeled and notched⁹² 87-127 (♀♀ 87-119; ♂♂ 103-127).

For characters common to all species, and synopsis of scale-counts, see pp. 49-52, 55.

Color. Above green or olive, the interstitial skin black; on nape and anterior part of back occasionally a longitudinal series of paired black spots which may coalesce to form crossbars; some scales with a white basal spot with, or without, black edging. Below, greenish yellow or very pale green.

Size. Length of ♂ (B.M. 84.11.24.5) 1070 (720 + 350) mm., from Sierra Leone; of ♀ (M.C.Z. 51120) 1080+ (785 + 295+) mm, from Cholo Mountain; while the amended measurement of another ♀ (T.M. 18560) 1030 (710 + 320) mm., from as far south as Silinda Mountain, is recorded by FitzSimons (1939b: 22).

Remarks. Both *Coluber caeruleus* Lacépède and Daudin's substitute name of *caeruleescens* are preoccupied by Linnaean names for very different reptiles from the Cape Verde snake with 170 ventrals. The latter certainly appears to be an *irregularis* with truncated tail (its subcaudals allegedly numbering only 64). Consequently the name *irregularis* Leach, 1819 — which has been

⁸⁹ 8 labials, the 3, 4, 5 entering on 9 sides (3 snakes have it on both), 8 labials, the 4, 5 entering on 1 side (L. Mutanda; M.C.Z. 48288). 8 labials, the 4, 5, 6 entering on 1 side (Bundibugyo; M.C.Z. 48279). 9 labials, the 4, 5, 6 entering on 199 sides (94 snakes have it on both). 9 labials, the 5, 6 entering on 4 sides (Mlanje Mtn.; A.M.N.H. 67766 has it on both but too many subcaudals for *hoplogaster*). 9 labials, the 5, 6, 7 entering on 1 side. 10 labials, the 5, 6, 7 entering on 2 sides (Rhino Camp; U.S.N.M. 42479; Chiradzulu; M.C.Z. 51176; on one side of each snake).

⁹⁰ 183 recorded by Villiers (1952b) and double-checked by me.

⁹¹ Entire in a snake from the Misuku Mountains (M.C.Z. 51110), another from Mayumbe (M.C.Z. 42912), and a third from Sierra Leone (B.M. 68.5.27.10), etc.

⁹² 86 in the type of *vernayi*, but on re-examination FitzSimons finds the tail tip, though terminating in a slender spine, less tapering than in other specimens so possibly lost in early life (26.ii.51); 87 for a Dundo snake (*vide* Laurent) etc., but all those below 90 that I have examined possessed regenerated terminal points.

in general use for almost a century and a half—should yield precedence to *caesioides* Cloquet, 1818, which has never been used by any other author. So unfortunate a change was avoided by invoking action by the International Commission on Zoological Nomenclature who ruled that it be suppressed (Opinion 328 of 7.i.1955).

The type *alborariata* A. Smith appears to be lost according to V. F. FitzSimons (1937a).

C. angolensis (Bocage; 1882c) cannot be separated from *irregularis* (with which its author later synonymized it) by its loreal being "scarcely longer than deep," for in typical *irregularis* the length of the loreal ranges from $1\frac{1}{2}$ to $2\frac{1}{2}$ times its depth. Bocage based the name on an aberrant *irregularis* in which the third labial was excluded from the orbit. From time to time similar individuals have been recorded as occurring alongside normal *irregularis* throughout much of its range (as here defined) but form less than 5 per cent of the population. They are inseparable from the northeastern population which I have named *irregularis battersbyi*, as *angolensis* cannot be applied to them.

C. emini (Günther; 1888a) was based on a snake in which the ventrals lacked lateral keels, such individuals being not at all uncommon. Witte (1933m) recorded both *irregularis* and *emini* from Elisabethville, Kikondja, Lulenga, Nyonga, Shangugu without it apparently occurring to him that they were synonymous. The actual credit for synonymizing *emini* with *irregularis* goes to Flower (1933) who remarks that in Sudanese snakes the keels "on the ventral shields may be perceptible, just perceptible, or not perceptible." The question arises as to whether keels are always present in western, or distinct from central, African *irregularis*.

C. vernayi FitzSimons (1932), was synonymized by Bogert (1940) with *irregularis* in the broad sense in which it was then understood.

Sternfeld's (1908b) Togo record of "*natalensis*" was referred by Angel (1933f) to *irregularis*, but the data clearly suggests he was dealing with an example of *heterolepidotus*. I myself (1936h:

1937e) was mistaken, though with good reason, for considering that *heterolepidotus* (Günther) and *schubotzi* Sternfeld were synonyms of *irregularis* (Leach).

It may be observed that on the basis of scale-counts there are some slight grounds for separating a northwestern race of *irregularis* from those in the rest of Africa (for Angola and Congo snakes are essentially like those extending towards the southeast). The actual figures are:

Subcaudals

Southeast etc. ♂ ♂ 103 (Angola) and 106 (Nyasaland) to 121 (Nyasaland).

Northwest ♂ ♂ 113 (Liberia) to 127 (Sierra Leone).

Southeast etc. ♀ ♀ ? 90 (Angola) and 97 (Nyasaland) to 121 (Angola).

Northwest ♀ ♀ 100 (Dakar) to 119 (Sierra Leone).

Ventrals

Southeast etc. ♂ ♂ 150 (Angola) and 152 (Nyasaland) to 167 (F. E. Africa).

Northwest ♂ ♂ 162 (Liberia) to 179 (Portuguese Guinea).

Southeast etc. ♀ ♀ 153 (Nyasaland), 154 (Angola) to 170 (Angola; Sudan).

Northwest ♀ ♀ 162 (Sierra Leone) to 183 (Senegal).

However, the overlap in *average* specimens is so extensive that an attempt at separation would inevitably result in deplorable confusion.

Dentition. Maxillary teeth 22 (Liberia) to 28 (Congo, etc.) in six snakes examined by Bogert (1940), who found that they were subequal in some, increasing in size posteriorly in others.

Anatomy. Parotids present (Phisalix).

Hemipenis. Not bifurcate; sulcus spermaticus undivided; basal spines large, merging on the middle third into reticulate calyces which grade into papillae towards the tip, which extends to the seventh or ninth subcaudal (Bogert).

Sexual dimorphism. None so far as the number of ventrals and subcaudals are concerned.

Breeding. At various times I have recorded the following: On September 30, a Misuku Mtns. ♀ held 11 eggs measuring *ca.* 15 x 11 mm.

October 9, a Misuku Mtns. ♀ held 7 eggs measuring *ca.* 30 x 12 mm.

December 21, a Bundibugyo ♀ held 5 eggs measuring *ca.* 22 x 7 mm.

December 28, a Chirinda Forest ♀ held 8 well-developed eggs (FitzSimons).

January 16, Ruwenzori Mtns. ♀ held 5 eggs from 28 x 12 to 32 x 11 mm.

February 10, a Kisenyi ♀ held 8 eggs measuring *ca.* 25 x 10 mm.

Also, on February 1, at Mushongero, Lake Mutanda, a native brought me 193 eggs, allegedly dug from two termitaria. One batch of 8 eggs measured 25 x 14 mm., another of 8 measured 39 x 17 mm., while 3 eggs selected from other batches measured 43 x 18 mm., 30 x 18 mm., and 29 x 18 mm. respectively, their diameter evidently conditioned by the girth of the parent. Each egg contained an embryo nearly ready for hatching, the embryo measuring 203 (143 + 60) mm., and on hatching a few weeks later a ♂ measured (180 + 80) mm., and a ♀ 249 (180 + 69) mm.

Diet. I have recorded a large lizard (*Lacerta jacksoni*), toads (*Bufo r. regularis*) twice, as also FitzSimons. Mertens has reported a tree-frog (*Leptopelis* sp.?) in one stomach and Laurent recovered sedge-frogs (*Hyperolius m. angolensis*) from two snakes. I found a sedge-frog (*Hyperolius schubotzi*) in each of three Idjwi Island *irregularis*, and an unidentifiable *Hyperolius* in a Nyasa snake; a frog (*Rana f. fuscigula*) at Lake Mutanda, and two *Rana o. oxyrhynchus* in Cholo reptiles.

Parasites. Hemogregarines were found in Stanleyville snakes by Schwetz; nematodes (*Amphicaecum* sp. and *Ascaroidea* sp.) in an Idjwi specimen (Loveridge).

Enemies. Two were recovered from the stomachs of vine-snakes (*Thelotornis k. kirtlandii*) on Cholo Mountain.

Temperament. A Kisenyi snake, when suddenly seized, gaped until its jaws were almost in a single plane; then it struck, the teeth drawing a little blood (Loveridge).

Habitat. Occurs from sea-level to 7,000 feet, having been taken in Belgian Ruanda just below the Bihunga Escarpment (Bogert). In the Sudan it has been found in an outhouse and beneath a rock on a mountain top (Corkill). In Uganda, it was captured

while basking on the bank of a dry watercourse at 6,000 feet, also among vegetation on the bank of the Amaler River at 5,000 feet. In fact it is generally associated with rivers, lakes, and swamps where its principal prey is to be found, though it also occurs in virgin forest (Loveridge). It has been recorded as present in borassus palm "forest" (Cott), in pawpaw tree (Schmidt), in papyrus (Stuhlmann), and the sudd. And it has been suggested that Khartoum records are due to these snakes having been transported there with agricultural produce carried on Nile steamers (Flower).

Localities. **Sudan:** Bahr el Jebel; Hellet Nuer; *Kagelu; *Katire; Lake No; Metemma; *Mongalla; Moro; Talodi. **Ethiopia:** *Mtemma (on Sudan frontier:C.N.H.M. 12719). **Uganda:** Bihunga Escarpment; *Bukatakata; *Bundibugyo; *Bussu (an intermediate); *Debasien Mtn.; Entebbe; Fort Portal; *Gulu, Aeholi; Kabulamuliro; Kampala; Katonga River; Katunguru, Kasinga Channel; Kayonza (Kanjonsa), Kagera River; Kayonza Forest; Kigezi; Kishasha Valley; *Kissolo; Komo Id.—*Busiro; Kyagwe Coast; Lado = West Nile District; Lake Albert; *Lake Bunyonyi; Lake Chahafi; Lake Edward; Lake George; *Lake Mutanda—*Mushongero; Lake Nakwali, Ankole; *Lira, Lango; Lugazi, Kyagwe; *Mabira Forest—*Mubango; Masaka; Nkosi Id.; Rhino Camp, Lado; *Ruwenzori Mts.—Kilembe, *Mihunga Ridge, Mubuku Valley; Wadelai. **Tanganyika Territory:** Bukoba; Bwanja near Bukoba; *Kibondo; *Kihambwe River, Kibondo; *Matengo Mts., *Nyarunga, Kibondo; *Mwaya; Rungwe Mtn.; Tukuyu (as Langenburg); *Ugano. **Mozambique.** Boror (Praso Boror); Charre; Fambani; Quilimane (type of *güntheri*). **Nyasaland:** *Blantyre (type of *shirana*); *Chiradzulu Mtn.; *Cholo Mtn.; Fort Hill; Karonga to Kondowe; *Limbe; *Misuku Mts.; Mlanje Mtn.; *Mtimbuka; *Nchenaehena; "Nyika Plateau" (1897e); *Ruo River; Shire Highlands and Valley. **Northern Rhodesia:** Kazungulu; Lealui (Lialui); Mumbwa; Upper Zambezi. **Southern Rhodesia:** Chirinda Forest; *Chishawasha; Mashonaland; Mazoe⁹³; Salisbury⁹³; Selinda Mtn.; Selukwe; Umtali; Victoria Falls. **Bechuanaland Protectorate:** Mauu (type of *vernayi*). **Southwest Africa:** Damaraland (1887h);

⁹³ Labial arrangement checked by Walter Rose; cf. footnote to Salisbury example of *hoplogaster*.

1894a); Otjimbingue (Peters:1867b). **Angola** (inc. *angolensis* records): *Bella Vista; Bimbi; *Caconda; Cambondo; Capelongo; Cazengo region; Chingo; Congulu; Cuango; Cubal; Cubango; *Cuma; *Cunga; Dundo; Duque de Braganca; Loeti River (as *neglectus*); Malange; Moco Mtn.; Mossamedes; Muita; Mupa; Mutianvo; Ndala (Ndallo) Tando; Pungo Ndongo; Rio Mbale; San Salvador; Vila da Ponte. **Cabinda**: Chinchexo; Landana. **Belgian Congo**:⁹⁴ Aba; Albertville; Beni; Bishakishiaki River; Bobandana; Boma; Bulengo near Lake Mugunga; Buringa; Buye-Bale River; Dika; Dramba; Elisabethville; Faradje; Ganza; Ishango, Semliki River; Idjwi Id.—*Upper Mulinga River; Kabenga; Kabengere; Kabwe; Kakyelo; Kalondo, Mokoto; Kalule-Nord River; Kamalondo Plain; Kando; Kankunda River; Kansenia; Kantana, Lake Kivu; Kanzenze; Kapanga; Kapiri; Kasenga; Kaswabilenga; Katanda, Lake Ndaraga; Katobwe; Kenia; Kikondja; Kilwa; Kilwezi; Kisala; Lake Tanganyika; Lukafu; Lukoka River; Lukolela; Lukonzolwa; Lukuga River; Lululabourg; Lusinga; Mabwe; Mahagi Port; Makaia Ntete; Makala; *Mangbetu (Monbuttu: type of *emini*); Masombwe; Mati; *Mayumbe; Mokabe-Kasari; Mpala; Mubale-Munte; Mukandwe; Mulungu; Mulungwe River; Munagana, Lake Rukuru; Mutwanga; Ngesho; Niangara; Nyangwe; Nyonga; Nyunzu; Panda; Pare Upemba; Pelenge; Povo Nemlao; Povo Netonna; Pweto; Rungu; Rwindi; Sake, Lake Kivu; Sandoa; Savane; Stanleyville; Tshishaka; Tshumba; Upper Uele River; Vista; Yakululu; Zambi; Zongo. **Belgian Ruanda-Urundi**:⁹⁴ Below Bihunga Escarpment; Goma, Lake Kivu; Kalondo, Lake Ndaraga; *Kisenyi, Lake Kivu; Lulenga: Rwankeri; Shangugu, Lake Kivu; Usumbura. **French Congo**: Abiras; Gabon; Yakoma. **French Equatorial Africa**: *Fort Crampel; *Fort Sibut. **French Cameroon**: Cameroon (type of *longifrenatus*); Bipindi; Satsche (not found on map); Tibati; Yaunde. **British Cameroon**: Kaka region, Bamenda District. **Nigeria**: Brass, Lower Niger River; *Ibadan; Owerri Province. **Togo**: Adele (as Bismarckburg); Atakpame; Kete; Moba; Yendi. **Ghana**: *Aecra; *Achimota; *Adjiko, Krobo; Akropong; *Banda Hills; Christian Village; Fantee (type of *irregularis*). **Ivory Coast**:

⁹⁴To these should be added 40 fresh localities: in the Belgian Congo (8), Ruanda (20) and Urundi (12) recently recorded by Laurent (1956, pp. 161-163).

Abidjan; Guiglo-Tai. **Liberia:** *Bolahun; *Ganta; *Gbanga; *Suacoco. **Sierra Leone:** *Bonthe; *Makeni; *Njala. **French Guinea:** "Guinea" (type of *chenonii*); Beyla; Dixine; Ferkessedougou; Kerouane; Labe, Fouta Djalon; Nimba Mtn.; Timbo; Ziela. **Portuguese Guinea:** *Bissau; Bolama; Caita; Pitehe; Ponte. **Gambia:** *Cape St. Mary; *McCarthy Id. **Senegal:** Bel Air; Canbarene Road near Dakar; Cap Vert (type of *caesius*); Dakar; Ilann; Kati near Bamakko; Mbaou; Rufisque; Sangalkam; Yoff. **French West Africa:** Dano near Diebougou, Upper Volta; Duong-Huu-Thoi; Kayo.

Range. Senegal, due east to Metemma (if data reliable), Ethiopia on Sudan border, on the White Nile, Sudan, south down Lakes Victoria, Tanganyika and Nyasa to Southern Rhodesia, west to Damaraland (single record), north and west to Senegal. In brief: West and Central Africa south of 15° N. and north of 20° S., but following the Zambezi east to the vicinity of Nyasaland.

PHILOTHAMNUS NATALENSIS (Smith)

1840. *Dendrophis (Philothamnus) natalensis* A. Smith, Ill. Zool. S. Africa, Rept., pl. lxiv, figs. 1-3: "Port Natal," i.e. Durban, Natal, South Africa.
1847. *Dendrophis natalensis* Bianconi, p. 278.
1859. Bianconi, p. 502.
- 1858c. *Ahaetulla irregularis* var. *natalensis* Günther, p. 152.
- 1863c. *Ahaetulla natalensis* Günther, p. 285.
1890. Müller, p. 694.
- 1867a. *Leptophis irregularis* Steindaehner (not Leach), p. 71.
- 1882c. *Philothamnus natalensis* Boeage, p. 18.
- 1884a. Rochebrune, p. 173 (omitted as erroneous).
- 1887b. Boettger, p. 160.
- 1887h. Boulenger (part), p. 176 (omit Damaraland).
- 1951c. Loveridge, pp. 4, 9.
- 1894a. *Chlorophis natalensis* Boulenger (part), p. 95 (omit Damaraland).
1898. Werner, 1896-7, p. 144.
1898. Selater, p. 99.
- 1908b. Boulenger, p. 228.
1908. Gough, p. 24.
1908. Odhner, p. 5.
- 1910b. Boulenger (part), p. 507 (omit Kafue River).

- 1910a. Hewitt, p. 57.
 1912. FitzSimons, F. W., p. 87.
 1913. Hewitt & Power, p. 162.
 1914a. Hewitt, pp. 242, 245, 246.
 1929a. Werner, p. 100.
 1935. Power, p. 334.
 1937a. FitzSimons, V. F., p. 262.
 1937e. Hewitt, p. 59, fig. 6.
 1950. Fantham & Porter, p. 601.
 1950. Rose, p. 271.
 1955. Rose, pp. 92, 97.
 1903. *Chlorophis angolensis* Gough (not Boeage), p. 465 (Durban).

Further citations of "*natalensis*" will be found under *hoplogaster*, *i. irregularis* and *heterolepidotus*.

Common Name. Natal Green-Snake (F. W. FitzSimons).

Description. Preocular 1; postoculars 2; temporals 2 + 2, rarely 1 + 2⁹⁵ or 2 + 1; upper labials 8-9, the fourth and fifth, or fifth and sixth, entering the orbit; lower labials 10-11, the first 5 in contact with the anterior sublinguals. Midbody scale-rows 15; ventrals 150-168⁹⁶ ($\delta \delta$ 150-165; $\text{♀} \text{♀}$ 151-168); anal divided, rarely entire⁹⁷; subcaudals 114-128 ($\text{♀} \text{♀}$ 114-122; $\delta \delta$ 120-128).

For characters common to all species, and synopsis of scale-counts, see pp. 49-52, 55.

Color. Above, olive green, the interstitial skin black; usually some scales with a white spot on their outer border. Below, chin and throat white, otherwise greenish white to pale green.

Size. Length of δ (B.M. 87.12.6.9) 775 (500 + 275) mm.; length of ♀ (B.M. coll. Stratham) 1083+ (755 + 328+) mm.

Remarks. The type of *natalensis* is not in the British Museum, and the specimen in the Royal Scottish Museum differs from Smith's description both in its fused temporals and greater dimensions (V. FitzSimons). The numerous subcaudals of *natalensis*, surpassed only by *heterolepidotus* and *semivariiegatus*

⁹⁵ 1 + 2 of Boulenger (1894a :95) was based on the Kingwilliamstown specimen and has been checked.

⁹⁶ Actually 167 and 168 for the two Kingwilliamstown $\text{♀} \text{♀}$ that Boulenger (1894a :95) recorded as 169.

⁹⁷ Entire only in a Natal ♂ (H. Calloway coll.) in the British Museum.

(*sensu lato*), with a trifling overlap by *i. irregularis*, and possibly the almost constant temporal arrangement of 2 + 2, suggest that *natalensis* is one of the most highly specialized members of the subgenus *Chlorophis*.

Sexual dimorphism. In ♀♀ the subcaudals range from 114 to 122; the ventrals overlap. In ♂♂ the subcaudals range from 120 to 128.

Diet. Sir A. Smith's statement that *natalensis* reputedly feeds on birds and insects may be discounted until established by concrete observations. A gecko (*Afroedura p. pondolica*) is present in the stomach of one Museum of Comparative Zoology specimen.

Parasites. To this species Fantham and Porter (1950) attribute the entozoa (*Eutrichomastix serpentis*), and juvenile cysticerci that they found in the mucous and serous coats of the stomach, or embedded in the peritoneum, of a "3½ foot" ♂ and "4½ foot" ♀. If their measurements are correct, however, it would seem more probable that the snakes involved were *P. s. semivariegatus*.

Habitat. Shrubs and trees in the vicinity of Durban, where, being a good climber, the Natal Green-Snake is rarely seen on the ground (A. Smith).

*Localities.*⁹⁸ **Transvaal:** Henops River near Pretoria; Lydenburg; Middleburg; Pretoria; *Selati, Zoutpansberg District; Vryheid. **Natal:** Cathkin Peak, Drakensberg Mountains (V. Fitz-Simons coll.:1943); Caversham; Dargle Road; Durban; *Natal (head in M.C.Z.). **Cape Province:** Blue Cliff; Clarksbury; Dunbrody; East London; Grahamstown; Harrismith; Kimberly; *Kingwilliamstown; Mossel Bay; Mqanduli; *Orange River; Port Elizabeth; *Port St. Johns; Tsomo.

*Range*⁹⁸: Transvaal, south to Natal and eastern Cape Province.

PHILOTHAMNUS HETEROLEPIDOTUS (Günther)

1863c. *Ahaetulla heterolepidota* Günther, Ann. Mag. Nat. Hist., (3) 11, p. 286; Africa.

1872a. Günther, p. 26.

1866a. *Leptophis heterolepidota* Bocage, p. 48.

1866b. Bocage, p. 69.

⁹⁸ The two Rhodesian specimens, i.e. Kafue River (Boulenger:1910b) and Salisbury (Boulenger:1902b), are assumed to be *hoplogaster*; the Damaraland snake proved to be an aberrant *i. irregularis*.

- 1879a. *Philothamnus heterolepidotus* Boeage, p. 96.
1882c. Bocage, p. 8, fig. 2.
1887a. Bocage, p. 185.
1888a. Boettger, p. 60.
1893. Pfeffer, p. 82 (possibly *semivariogatus*).
1895a. Bocage, p. 88.
1896a. Bocage, p. 100 (repeats Pfeffer's record for Mozambique).
1951c. Loveridge, pp. 5, 10.
1952. Witte, p. 19.
1953. Witte, p. 186, fig. 53.
1954b. Laurent, p. 48.
1954d. Laurent, pp. 292, 305.
1956. Laurent, p. 167, fig. 28, pl. xviii, fig. 2.
1888b. *Ahaetulla gracillima* Günther, Ann. Mag. Nat. Hist., (6) 1. p. 326:
Lower Congo, Belgian Congo.
1894a. *Chlorophis emini* Boulenger (part: not of Günther), p. 92 (omit
type from Monbuttu).
1903b. Andersson, p. 3.
1908a. Werner, p. 170.
1916a. Loveridge, pp. 78, 83, 84.
1918a. Loveridge, p. 333.
1924b. Loveridge, p. 5.
1929h. Loveridge, p. 21.
1933m. Witte (part), p. 88.
1935a. Corkill (part), p. 16.
1951. Monard, p. 150.
1894a. *Chlorophis heterolepidotus* Boulenger, pp. 95, 358, pl. v, fig. 3.
1896d. Boulenger, p. 631.
1896. Tornier, p. 69.
1897b. Boulenger, p. 278.
1897. Tornier, p. 69 (reprint of 1896).
1897b. Tornier, p. 65.
1898. Boettger, p. 58.
1902a. Werner (part), p. 344 (part *irregularis*).
1905c. Boulenger, p. 112.
1908b. Sternfeld, pp. 214, 230.
1909a. Sternfeld, p. 14.
1910a. Sternfeld, p. 18 (perhaps omit Pfeffer's Quilimane record).
1912c. Sternfeld, p. 270.
1915a. Boulenger, p. 205.
1915e. Boulenger, p. 623.
1917. Sternfeld, p. 468.
1918a. Loveridge, p. 333.

- 1919a. Boulenger, p. 281.
 1923. Schmidt, p. 76.
 1924b. Loveridge, p. 5.
 1926a. Mertens, p. 153.
 1929. Hecht, pp. 333, 334.
 1929h. Loveridge, p. 23.
 1929a. Werner, p. 100.
 1931. Monard, p. 104.
 1932a. Parker, p. 219.
 1933f. Angel, p. 106, figs. 39-39a.
 1933m. Witte (part), p. 89.
 1934. Pitman, p. 294 (but *heterolepidotus* is unknown from Rhodesia).
 1934a. Schwetz, p. 380.
 1936. Pitman, p. 277, pl. v, fig. 4; pl. E, fig. 2.
 1937b. Monard, pp. 114, 120.
 1938a. Pitman, p. 306.
 1938b. Pitman, pp. 39, 90, 91, 306 (pls. as in 1936).
 1940b. Monard, p. 175 (though possibly *irregularis*).
 1942e. Loveridge, p. 273.
 1950. Ionides, p. 101.
 1950f. Laurent, p. 128.
 1895. *Chlorophis gracillimus* Günther, p. 528.
 1908b. *Chlorophis natalensis* Sternfeld (not A. Smith), pp. 214, 229.
 1909a. Sternfeld, p. 14.
 1910d. *Chlorophis gracilis* Sternfeld, Mitt. Zool. Mus. Berlin, **5**, p. 64:
 Dodo, French Cameroon.
 1929. Hecht, p. 332.
 1951. Monard, p. 150.
 1912e. *Chlorophis schubotzi* Sternfeld, Wiss. Ergebn. Deut.-Zent.-Afrika-
 Exped. 1907-1908, **4**, p. 269, fig. 4: Bwanja, near Bukoba, Tan-
 ganyika Territory.
 1915e. Boulenger, p. 622.
 1924b. Loveridge, p. 5.
 1929. Hecht, p. 332.
 1929a. Werner, p. 100.
 1916a. *Chlorophis irregularis* Loveridge (not Leach), p. 84.
 1918a. Loveridge, p. 333.
 1919d. Chabanaud, p. 567.
 1924b. Loveridge, p. 5.
 1929h. Loveridge, p. 23.
 1935a. Corkill (part), p. 16.
 1936j. Loveridge (part), p. 247 (omit Mt. Debasien).

- 1937c. Loveridge (part), p. 273 (omit Fort Sibut).
 1941. Witte (part), p. 188 (Kalinga specimen).
 1923. *Chlorophis bequaerti* Schmidt (part), Bull. Am. Mus. Nat. Hist., 49, p. 75, fig. 3: Niangara, Belgian Congo (based on an aberrant *heterolepidotus* ♂ with entire anal; omit paratype ♀, which is regarded as a similar aberrant *irregularis*).
 1933m. *Chlorophis ornatus* Witte (not Bocage), p. 88.
 1933m. *Chlorophis hoplogaster* Witte (part: not Günther), p. 88 (Faradje).

Further citations of "*heterolepidotus*" will be found under *i. irregularis*.

Common Names. Slender Green-Snake (Loveridge); Strange-scaled Green-Snake (Pitman); *calumberembe* (Angola: Bocage); *chilembe* (Cabinda: Bocage); *lolengue-lengua* (Angola: Bocage).

Description. Preocular 1, rarely 2⁹⁹; postoculars 2, rarely 1¹⁰⁰; temporals 1 + 1, rarely 0 + 1¹⁰¹ or 1 + 2; upper labials 7-9, the third and fourth,¹⁰¹ or third, fourth and fifth, normally the fourth, fifth and sixth, entering the orbit; lower labials 9-11,¹⁰² the first four, five, or six in contact with the anterior sublinguals. Midbody scale-rows 15; ventrals 164-193¹⁰³ (♂♂ 164-193; ♀♀ 169-193); anal divided rarely entire¹⁰⁴; sub-caudals 109-134 (♀♀ 109-126; ♂♂ 115-134¹⁰⁵).

For characters common to all species, and synopsis of scale-counts, see pp. 49-52, 55.

Color. Above, dark or bronzy green, the interstitial skin black; some scales with a white basal spot. Below, chin and throat white, otherwise greenish white or yellowish to very pale green.

⁹⁹ Two present in a Kaimosi ♀ (M.C.Z. 29426).

¹⁰⁰ On both sides of a Kaimosi ♂ (M.C.Z. 29423).

¹⁰¹ 0 + 1 through fusion with sixth labial on right side of a Tembwe ♀ (Mus. Congo 4184) whose fourth and fifth labials are also fused on this side, resulting in its determination as "*ornatus*" (Witte).

¹⁰² Actually 12 on left side of a Poli ♀ (M.C.Z. 44104) resulting in the first seven labials being in contact with anterior sublingual.

¹⁰³ 193 in a Niangara ♂ (A.M.N.H. 12087).

¹⁰⁴ Entire in the holotype ♂ *bequaerti* (A.M.N.H. 12080) from Niangara.

¹⁰⁵ 134 in the type of *bequaerti*, besides a Lagos ♂ (B.M. 71.4.21.4) and a Katobwe snake (C.N.H.M. 12874). Laurent (1954b) gives 144 for a Dundo ♂, a figure which far surpasses all species except *semivariegatus*.

Size. Length of ♂ (M.C.Z. 48300) 730 (492 + 238) mm., from Kitaya, is exceeded by a ♂ (Laurent:1956) 745 (475 + 270) mm., from Makungu.

♀ (type of *heterolepidotus*) 662 (450 + 212) mm., remeasured.

♀ (type of *gracillimus*) 722 (480 + 242) mm., remeasured.

♂ (type of *bequaerti*) 652 (440 + 212) mm.

(type of *schubotzi*) 565 (380 + 185) mm.

(type of *gracilis*) 450 (300 + 150) mm.

Remarks. The type of *Ahaetulla heterolepidota* was stated by Günther (1863c) to have 187 ventrals and 125 subcaudals; amended by Boulenger (1894a) to 182 ventrals and 117 subcaudals recounted by Battersby and myself as 182 + 4 halves and 119 subcaudals while I find the former length of 441 + 216 mm. is now 450 + 212 mm. I mention this as the British Museum has a "Zanzibar Coast" specimen of almost identical proportions (423 + 215 mm.) and scale-counts as given by Günther for the holotype of *heterolepidota*. However, Mr. Battersby does not think that a transposition has taken place as the head scales of the Zanzibar snake do not tally with Günther's description.

A. gracillima Günther was referred to the synonymy by Pfeffer (1893); *C. gracilis* Sternfeld by Boulenger (1919a), whose "emini" was a composite of *heterolepidotus* + *emini* Günther, which is a synonym of *irregularis*. It was in this composite sense of "emini" that I (1936h) synonymized *C. schubotzi* Sternfeld with "irregularis." In reality *schubotzi* is a synonym of *heterolepidotus* as here understood. To that synonymy I now add the ♂ type of *bequaerti* Schmidt which differs from typical *heterolepidotus* only in having an entire anal. The ♀ paratype of *bequaerti* I consider to be an aberrant *irregularis* with entire anal. Normal examples of both *heterolepidotus* and *irregularis* from Niangara were present in the same collection.

Sexual dimorphism. Unless there exists some slightly lower average subcaudal count for ♀ ♀, no other characters for separation of the sexes have been detected.

Diet. A sedge-frog (*Hyperolius cinnamomeoventris*) removed from a Makungu snake (Laurent:1956), others (*Hyperolius rossi* = *pachyderma*) and sp. were recovered from the stomachs of three Uganda snakes, also a frog (non det.) in a Tanganyika specimen (Loveridge:1942e).

Habitat. Apparently associated with tropical rain-forest or the gallery forests fringing the equatorial river systems.

Localities. **Sudan:** Barboi; Khartoum (probably introduced on Nile steamer); 500 miles south of Khartoum; *Torit; White Nile (1882). **Uganda:** *Bukatakata; Katunguru; *Lira. Lango; *Nyakabande; Rhino Camp, 2°55', West Nile Province. **Kenya Colony:** *Kaimosi; *Kakamega; *Yala River. **Tanganyika Territory:** Bwanja near Bukoba (type of *schubotzi*); *Kibondo; *Kigoma; *Kitaya; Masailand (*vide* Sternfeld:1910a); a questionable record possibly based on a specimen of *semivariiegatus*; *Nyarunga, Kibondo; Zanzibar coast (i.e. mainland opposite island). ? **Mozambique** (the sole record is that of Pfeffer (1893), repeated by Sternfeld (1910a), for three snakes from Njama Kette near Quilimane, possibly *semivariiegatus*). **Angola:** Bihe; Bimbi; Caconda; Casangue; Catengue; Cuango (Quango); Cuibula (Quibula); Dundo (Dondo); Duque de Braganca; Kutatu (Kutato); Muita River; Sao Salvador. **Cabinda:** Cabinda (1895a). **Belgian Congo:**¹⁰⁶ Albertville; Boma; Cap Kasembondo, Lake Tanganyika; Duma; Elisabethville; Faradje; Inkangala; Kabongo; Kabwe; Kabwekanono Lake; Kadia; Kando¹⁰⁷; Kapanga; *Katobwe; Kikondja; Landana; Lofoi; *Lower Congo (type of *gracillima*); Mahagi Port; Masombwe; Mubale-Munte; Musosa; *Niagara; Nyonga; Pweto; Tembwe; Tshikapar; Sandoa; Stanleyville; Zambi. **Belgian Ruanda-Urundi:**¹⁰⁶ Lake Kivu. **French Cameroon:** Dodo (type of *gracilis*); Kribi. **British Cameroon:** *Poli near Garoua. **Nigeria:** *Lagos. **Dahomey:** Porto Novo. **Togo:** Kete.

Range. Sudan from the Upper Nile southeast to the mouth of the Rovuma River, Tanganyika Territory (? Mozambique), west to Angola and north to Togo.¹⁰⁸

PHILOTHAMNUS SEMIVARIEGATUS SEMIVARIEGATUS (Smith)

1847. *Dendrophis (Philothamnus) semivariiegata* A. Smith, Ill. Zool. S. Africa, pls. lix, lx, lxiv, figs. 1a-b; Bushman Flat, Cape Province

¹⁰⁶ To these should be added 13 fresh localities: in the Belgian Congo (6), Ruanda (6) and Urundi (1) recently recorded by Laurent (1956, pp. 167-168).

¹⁰⁷ The Kansenia record is transferred to *i. irregularis*.

¹⁰⁸ Monard's (1940b) records from Portugese Guinea—1300 miles west of Togo—appear to be based on examples of *i. irregularis*.

- (restricted Bogert:1940) "and the country beyond Kurriehaine,"
i.e. Rustenberg, Transvaal.
- 1863e. *Ahaetulla semivariiegata* Günther, p. 285.
- 1866b. *Philothamnus punctatus* Peters, Monatsb. Akad. Wiss. Berlin, p. 889:
Zanzibar Coast, i.e. Tanganyika Territory.
- 1869a. Peters, p. 16, pl. i, figs. 2a-c.
- 1878a. Peters, p. 206.
- 1882a. Boeage, p. 289.
- 1882c. Boeage, p. 14.
- 1882a. Peters, p. 129, pl. xixA, fig. 1.
- 1884a. Rochebrune, p. 173 (omitted as unreliable).
1889. Boettger, pp. 289, 294.
1893. Pfeffer, p. 83.
- 1896a. Boeage, p. 92.
- 1867a. *Leptophis* sp. Boeage, p. 226.
- 1868a. *Ahaetulla Kirkii* Günther, Ann. Mag. Nat. Hist., (4) 1. p. 424:
Zanzibar.
- 1869b. Günther, p. 116.
1869. *Dendrophis melanostigma* Jan. Icon. Gén. Ophidiens, No. 32, pl. ii,
fig. 3: Mozambique.
- 1869b. *Philothamnus semivariiegatus* Peters, p. 661.
- 1870b. Peters, p. 114.
- 1884a. Rochebrune, p. 173 (omitted).
- 1891a. Boulenger, p. 307.
- 1891b. Matschie, p. 615.
- 1893b. Stejneger, p. 728.
- 1894a. Boulenger, p. 99.
- 1895a. Boeage, p. 90, pl. xiii, figs. 2a-c
- 1895e. Boeage, p. 13.
1895. Jende, p. 229.
- 1896a. Boeage, pp. 78, 83.
- 1896b. Boeage, p. 112.
- 1896d. Boulenger, p. 631.
- 1896e. Boulenger, p. 216.
1896. Tornier, p. 70.
1897. Bateman, p. 268.
- 1897b. Boulenger, p. 278.
- 1897d. Boulenger, p. 375.
- 1897e. Boulenger, p. 801.
- 1897g. Boulenger, p. 279.
- 1897i. Boulenger, p. 20.

1897. Meek, p. 179.
1897. Tornier, p. 65.
1898. Boettger, p. 58.
1898a. Boulenger, p. 720.
1898. Ferreira, p. 244.
1898. Johnston, p. 361a.
1898. Sclater, p. 99.
1898. Werner, 1896-7, p. 144.
1899a. Mocquard, p. 219.
1900b. Boulenger, p. 452.
1901. Schenkel, p. 160.
1902a. Boulenger, p. 446.
1902b. Boulenger, p. 17.
1902a. Werner, pp. 339, 344.
1903b. Andersson, p. 3.
1903a. Bocage, p. 43.
1907a. Boulenger, p. 10.
1907j. Boulenger, p. 486.
1907. Lönnberg, p. 15.
1907a. Roux, p. 76.
1907c. Roux, p. 735.
1908b. Boulenger, p. 229.
1908. Gough, p. 24.
1908b. Mocquard, p. 558.
1908. Odhner, p. 5.
1908b. Sternfeld, pp. 214, 230.
1908c. Sternfeld, pp. 243, 246.
1908. Werner (1907), p. 1873.
1909d. Boulenger, p. 311.
1909a. Sternfeld, p. 15.
1910b. Boulenger, p. 508.
1910a. Sternfeld, p. 19.
1910b. Sternfeld, p. 19, fig. 19.
1910c. Sternfeld, p. 55.
1911c. Boulenger, p. 165.
1911. Lampe, p. 193.
1911b. Nieden, p. 442.
1911a. Sternfeld, p. 250.
1912b. Boulenger, p. 332.
1912. FitzSimons, F. W., p. 87.
1912. Hobley, p. 49.
1912c. Sternfeld, p. 270.

1913. Boettger, pp. 345, 352, 359, 363.
1913. Hewitt & Power, p. 162.
1913. Klaptocz, p. 285.
1913. Lönnberg & Andersson, p. 4.
1913a. Werner, p. 373, pl. vii, fig. 2.
1913b. Werner, p. 717.
1915a. Boulenger, p. 206.
1915c. Boulenger, p. 623.
1915d. Boulenger, p. 648.
1916. Calabresi, p. 39.
1916f. Chabanaud, p. 372.
1916a. Loveridge, p. 84.
1917b. Chabanaud, p. 11.
1917a. Phisalix, p. 334.
1917. Sternfeld, p. 470.
1918a. Loveridge, p. 332.
1919a. Boulenger, p. 282.
1919g. Boulenger, p. 23.
1920. Aders, p. 338.
1921a. Chabanaud, p. 468.
1921b. Chabanaud, p. 524.
1921. Falk, p. 177.
1922. Aylmer, p. 15.
1922. Falk, p. 162, photo fig.
1923e. Loveridge, p. 879.
1924b. Loveridge, p. 5.
1925a. Angel, p. 33.
1925a. Loveridge, p. 72.
1927. Calabresi, p. 53.
1927c. Power, p. 409.
1928c. Barbour & Loveridge, p. 118.
1928. Cott, p. 953.
1928d. Loveridge, p. 53.
1928j. Loveridge, p. 74.
1929. Flower, p. 204.
1929h. Loveridge, p. 24.
1929c. Scortecchi, p. 274.
1929a. Werner, p. 98.
1930a. Scortecchi, p. 212.
1930c. Scortecchi, p. 17.
1931. Monard, p. 104.
1931. Power, pp. 43, 48.

- 1931c. Scortecci, p. 206.
1932b. Scortecci, p. 45.
1933b. Angel, p. 69.
1933f. Angel, p. 110, figs. 40-40a.
1933. Schmidt, p. 13.
1933m. Witte, p. 89.
1934a. Schwetz, p. 381.
1935a. Corkill, p. 17.
1935. Cott, p. 967.
1935. Power, p. 334.
1937. Andersson, p. 8.
1937a. FitzSimons, V. F., p. 262.
1937e. Hewitt, p. 60, fig. 5, pl. xviii.
1937b. Monard, pp. 114, 122.
1938. FitzSimons, V. F., p. 156.
1939a. Scortecci, p. 274.
1940a. Scortecci, p. 131.
1945. Leeson, p. 1.
1947. Ionides, 1946, p. 70.
1948. Ionides, 1947, p. 10.
1949a. Parker, p. 57.
1950. Leeson, pp. 46-48, 66, 133, figs. 20-22, pl. v.
1950. Rose, pp. 272, 314, fig. 9.
1950b. Villiers, p. 82, figs. 100-101.
1951. Monard, pp. 150, 160.
1954. Blair & Graham, p. 286.
1955. Rose, pp. 94, 178, fig. 9.¹⁰⁹
1881. *Philothamnus irregularis* var. Fischer, p. 229, pl. xiv, figs. 5-7.
1884a. Fischer, p. 11.
1882e. *Philothamnus Smithii* Bocage, Journ. Sci. Lisboa, 9, p. 12, fig. 5:
Bissau, Portuguese Guinea (restricted A.L.) and Angola.
1884b. Sauvage, p. 201 (as *Philothalmus*).
1886. Dollo, p. 156.
1887a. Bocage, p. 196.
1885. *Ahaetulla* sp. Müller, p. 683.
1886. *Ahaetulla irregularis* Parenti & Picaglia (not Leach), p. 74.
1930b. Zavattari, p. 193.
1888. *Leptophis punctatus* Mocquard, p. 128.
1888b. *Ahaetulla Bocagii* Günther, Ann. Mag. Nat. Hist., (6) 1, p. 326:
Angola.

¹⁰⁹ Variouslly spelled *Philothamnus* (92, 97), *Pholothamnus* (95), and *Philothamnus* (212).

1895. Günther, p. 528.
1889. *Philothamnus irregularis* Pfeffer (not Leach), p. 9.
1902. Ferreira, p. 232.
1893. *Philothamnus punctatus* var. *thomensis* Pfeffer (not Bocage), p. 84.
1893. *Philothamnus punctatus* var. *sansibaricus* Pfeffer, Jahrb. Hamburg. Wiss. Anst., **10**, p. 83: Zanzibar.
1894. *Ahaetulla punctata* Günther, p. 88.
1895. *Philothamnus Kirkii* Günther, p. 528.
1896. *Philothamnus variegatus* Peracca, p. 2 (lapsus).
1948a. Villiers, p. 203.
1896. *Philothamnus dorsalis* Tornier (not Bocage), p. 71.
1897. Tornier, p. 65.
1925. Angel, p. 32.
1933m. Witte (part), p. 90 (Faradje).
1896. *Philothamnus thomensis* Tornier (not Bocage), p. 71.
1897. Tornier, p. 65.
1910a. Sternfeld, p. 19.
1940. Parker, Moreau & Pakenham, p. 310 (correct earlier record).
1908c. *Chlorophis irregularis* Sternfeld (not Leach), p. 243.
1911. Lepri, 1910, p. 324.
1930a. Scortecchi, p. 212.
1923. *Philothamnus nitidus* Schmidt (not Günther), p. 78 (intermediates).
1925a. Angel, p. 32.
1930a. Barbour & Loveridge, p. 772.
1930b. *Chlorophis emini* Zavattari (not Günther), p. 193.
1933h. *Philothamnus semivariatus semivariatus* Loveridge, p. 238.
1934c. Mertens, pp. 27, 83, 118, 119.
1934. Pitman, p. 295.
1935b. FitzSimons, V. F., p. 313.
1936h. Loveridge, p. 32.
1936j. Loveridge, p. 247.
1936. Pitman, p. 42, pl. vi, fig. 1; pl. D, fig. 3.
1937c. Loveridge, p. 273.
1937f. Loveridge, pp. 493, 496, 503.
1937a. Parker, pp. 630.
1937b. Mertens, p. 13.
1937. Uthmüller, p. 110.
1938c. Mertens, p. 439.
1938a. Pitman, pp. 307, 328.
1938b. Pitman, pp. 39, 97, 295, 307, 328, pls. (as in 1936).
1939b. FitzSimons, V. F., p. 22.
1940. Bogert, p. 56.
1941. Moreau & Pakenham, p. 108.

- 1941a. Uthmüller, pp. 26, 42.
 1941b. Uthmüller, p. 235.
 1941. Witte (part), p. 199 (Bugazia).
 1942b. Bogert, p. 2.
 1942e. Loveridge, p. 274.
 1945b. Loveridge, p. 2.
 1950. Ionides, p. 101.
 1950f. Laurent, p. 126 (possibly some *P. s. dorsalis*).
 1950a. Villiers, p. 61.
 1951a. Loveridge, p. 192.
 1951e. Loveridge, p. 11.
 1952. Witte, p. 19.
 1953e. Loveridge, pp. 262, 318, pl. iv, fig. 1.
 1953. Witte, p. 195, fig. 56.
 1954. Battersby, p. 247.
 1954b. Laurent, p. 48.
 1954d. Laurent, pp. 292, 305.
 1955a. Mertens, p. 93.
 1933h. *Philothamnus semivariiegatus dorsalis* Loveridge (presumably not of Bocage, being 22 intermediates from Mwaya, Lake Nyasa; cf. remarks under *s. dorsalis*), p. 238.
 1937f. Loveridge, p. 496.
 1936. Pitman (part), p. 44.
 1938a. Pitman, p. 307.
 1938b. Pitman, pp. 99-100, 307.
 1941. Witte, p. 200.
 1946b. *Philothamnus* Mertens, pp. 17, 24 (defense reactions).
 1954d. ¹¹⁰*Philothamnus semivariiegatus nitidus* Laurent (not Günther), p. 296.
 1956. Laurent, p. 180.

Further citations of "*semivariiegatus*" will be found under *i. battersbyi* and *s. nitidus*.

Common Names. Spotted Wood-Snake (Flower); sundry other names have been suggested by Pitman (1938b, p. 97). *Alakara guindé* (Habbe at Bandiagara: Angel); *changa* (Yao: Loveridge); *ekumbu* (Teita: Loveridge); *hasowitu* (Pokomo: Loveridge); *kada* (Dahomey: Bocage); *kalembwe-lembe* (Dundo: Laurent); *kisumera* (Makonde at Kitaya: Loveridge); *kongoani* and *ukutiwiti* (Amu: Loveridge); *lubio* (Catumbela: Bocage);

¹¹⁰ But data derived from 1956 reference not incorporated here for reasons given in footnote to *P. s. nitidus*.

mlaluwe (Hehe: Loveridge); *namafwa* (Fipa: Loveridge); *namahamba* (Konde at Mikindani: Loveridge); *nalwinduwindu* (Misuku: Loveridge); *nawirangira* (Mawiha: Loveridge); *nhangga* (Gogo: Loveridge); *nombo* (Benguela: Bocage); *nyarubabi* or *nyaruteti* (Toro: Loveridge); *nyoka masamba* (i.e. garden snake. Nyungwe: Loveridge); *ngoe* (Sambaa, but supposed to be the young of *D. angusticeps*: Loveridge); *salalu* (Amba: Loveridge); *yarudutu* (Nyamwezi: Loveridge).

Description. Preocular 1, rarely 2¹¹¹; postoculars 2, rarely 1 or 3¹¹²; temporals usually 2 + 2, sometimes 1 + 1, 1 + 2, 2 + 1 or 2 + 3¹¹³; upper labials 8-10, the fourth and fifth; fourth, fifth and sixth; fifth and sixth; or rarely fifth, sixth and seventh entering the orbit¹¹⁴; lower labials 9-11, the first four, five or six in contact with the anterior sublinguals; midbody scale rows 15, rarely 13¹¹⁵; ventrals 164-217; anal divided: subcaudals 126-162.¹¹⁶

¹¹¹ Summary of preocular arrangement on 103 snakes in the M.C.Z.

102 have 1 preocular on each side of the head.

1 has 1 preocular on one side 2 on other (30138: Kigogo).

¹¹² Summary of postocular arrangement on 105 snakes.

1 has 1 postocular on each side of the head.

103 have 2 postoculars on each side of the head.

1 has 2 postoculars on one side 3 on other (40528: Debasien).

¹¹³ Summary of temporal arrangement on 107 snakes.

1 has 1 + 1 on each side of the head (42169: Waterberg: *tdorsalis*).

2 have 1 + 1 on one side of the head 1 + 2 on the other.

6 have 1 + 2 on each side of the head.

6 have 1 + 2 on one side of the head 2 + 2 on the other.

2 have 1 + 1 or 1 on each side (23259: Vituri; & Eritrea).

5 have $\frac{1}{1}$ or $\frac{1}{1+1}$ on one side 2 + 2 on the other.

3 have 2 + 1 on each side of the head.

7 have 2 + 1 on one side of the head 2 + 2 on the other.

1 has 2 + 1 on one side of the head 2 + 3 on the other.

74 have 2 + 2 on each side of the head.

¹¹⁴ Summary of upper labial (entering orbit) arrangement on 112 snakes

1 has 8 (with 3rd only, due to fusion) on each side (M.C.Z. 54825).

2 have 8 (with 4th & 5th) on one side, 9 (with 5th & 6th) on other.

2 have 8 (with 4th & 5th) on one side, 9 (4th, 5th & 6th) on other.

1 has 8 (with 5th only) on one side, 9 (with 5th & 6th) on other.

39 have 9 (with 5th & 6th) on each side.

8 have 9 (with 5th & 6th) on one side, 9 (4th, 5th & 6th) on other.

1 has 9 (with 5th & 6th) on one side, 10 (with 5th & 6th) on other.

48 have 9 (4th, 5th & 6th) on each side.

1 has 9 (4th, 5th & 6th) on one side, 10 (4th, 5th & 6th) on other.

8 have 9 (4th, 5th & 6th) on one side, 10 (5th, 6th & 7th) on other.

1 has 10 (5th, 6th & 7th) on one side, 10 (with 6th & 7th) on other.

¹¹⁵ 13 in a Kibwezi ♂ (M.C.Z. 40530) : also reported by Pitman (1936, p. 328) for a Lake Albert specimen.

¹¹⁶ 162 for an unsexed Belet Amin snake (*file* Scortecchi, 1939a), my highest is 161 for a Morogoro ♀ (M.C.Z. 18451), 160 for a Peccatoni ♂ (M.C.Z. 40538). Laurent (1950) has as low as 122 and 123 for Dundo ♀♀, 121 and 125 for Uvira and Lukuga ♀♀ (1956, p. 179) : see latter for other data and discussion.

Color. Above, head and body anteriorly dark green, uniform, or with a series of brown or black crossbars on nape and anterior part of back; usually some scales display a turquoise blue, or white, streak either with, or without, black edging; posteriorly paler green, with or without black spots on flanks. Below, labials, chin and throat yellow or white; belly yellowish green to yellow; subcaudals pale green or yellow.

Laurent observes (1954b:48) that in a series of 5 ♂♂ and 4 ♀♀ from Dundo and vicinity, the underside was distinctly lighter than the back in the ♂♂, but ventral coloring did not differ from the dorsal in the ♀♀.

The coloring, however, is extremely variable and the literature should be consulted for countless comments. Leeson (1950, p. 48) has figured a Ghana snake in color. The striking appearance of four Mozambique snakes noted by me (1923e, p. 879) was as follows: Above, head and neck pale green; body mauve, both freely speckled with black; tail plumbeous. Below, throat china-white; rest of undersurface whitish tinged with mauve, the ventral keels distinctly mauve. Tongue light blue, except for the tip and root which were black. Apparently these variations are not static enough to form a sound basis for geographical races. For example at Kitaya, on the Rovuma River, snakes with both blue and green heads were present, but at nearby Mikindani only one of a series of six *semivariiegatus* had a blue head.

Pitman has described the eye of a freshly killed snake as having the pupil large, circular, black; iris ring narrow, golden or deep yellow. Bocage's type was said to have deep reddish-brown eyes, the pupils surrounded with a narrow silvery ring. The tongue has been described as blue-green anteriorly, black at the tip and base (Falk:1922).

Size. Length of ♂ M.C.Z. 30137) 1205+ (800 + 405+) mm., from Mangasini; a perfect ♂ (M.C.Z. 30133) 1174 (742 + 432) mm., from Bagamoyo; length of ♀ (M.C.Z. 40534) 1233 (785 + 448) mm., from Lamu Id.

Remarks. Measurements are the only information furnished by Parenti and Picaglia (1886) for the "*Ahaetulla irregularis*" they recorded from Assab, Eritrea. Whatever the species, much of the tail would appear to be missing for they give the length as 820 (630 + 190) mm. A ♀ *i. battersbyi* from Mabira Forest

with a 627 mm. body has a 253 mm. tail; a ♂ *s. semivariiegatus* from Mikindani with 620 mm. body has a 366 mm. tail; a ♀ *s. semivariiegatus* from Siga Caves has 630 mm. body and a 350 mm. tail. As *P. irregularis* is unknown from Eritrea (apart from this oft-repeated record) and *P. s. semivariiegatus* does occur there, I believe their snake was a misidentified *semivariiegatus*. Similarly the "*irregularis*" from Mogadiseio, recorded by Lepri (1911) is clearly a *semivariiegatus*, its length 917 (602 + 315) mm. of tail far exceeding that of any eastern *irregularis* (i.e. *battersbyi*).

Parker, Moreau and Pakenham (1940) comment on the Jambiani Id. snake that Pfeffer (1893) erroneously referred to *thomensis*. Boulenger (1907j) points out that the labial and temporal arrangements of a Beira snake agree with *semivariiegatus* on one side and with *kirkii* on the other. Angel's (1933f) figures of 140-207 ventrals and 112-159 subcaudals are rejected as unacceptable; Pitman (1936) gives 149-207 and 112-159 respectively. FitzSimons (1937a) states that one of three snakes from Bushman Flat in the Royal Scottish Museum agrees precisely with the dimensions and subcaudal count of Sir A. Smith's type, but the ventrals are actually 215, not 207 as stated by Smith. A juvenile *nigrofasciatus* in the same museum resembles the specimen figured on Smith's plate lx.

Dentition. Maxillary teeth 21, subequal, but not so closely set as in "*Chlorophis*" (Bogert: 1940). Leeson (1950), who puts them at 14 to 20, usually 18, posterior longer than anterior, may not have allowed for shed teeth. He adds: palatine teeth 8; pterygoid 13; mandibular up to 26, subequal, or median teeth shorter than the others.

Anatomy. Parotids present (Phisalix).

Sexual dimorphism. The extensive material in the Museum of Comparative Zoology reveals that there is no sexual dimorphism in lepidosis; viz:

In ♂♂ the ventrals range from 164-217, the subcaudals 127-160. In ♀♀ the ventrals range from 164-200, the subcaudals 126-161. The extreme figures have been subjected to careful re-checking: all lower counts of subcaudals were found to have regenerated tail tips. It is possible that ♂♂ have relatively longer tails, a

point that requires investigation; in three Tanganyika ♀♀ Bogert found the ratio of tail length into total length was 32, 32, and 34%.

Breeding. The season is probably related to those of the monsoons, and not as extensive as the nine observations I have made would appear to suggest.

On October 14, in Matipa Forest, a ♀ held 5 eggs measuring 41 x 12 mm.

On November 25, at Morogoro, a ♀ held 6 eggs of small size.

On December 3, in Budongo Forest, a ♀ held 4 eggs measuring 30 x 8 mm.

On March 25, at Kitaya on Rovuma, a ♀ held 7 eggs measuring 21 x 7 mm.

On April 3, at Kitaya on Rovuma, a ♀ held 6 eggs measuring 11 x 3 mm.

On April 20, at Mikindani, a ♀ held 5 eggs measuring 28 x 8 mm.

On April 21, at Mikindani, a ♀ held 3 eggs measuring 29 x 8 mm.

On May 1, at Mbanja near Lindi, a ♀ held 5 eggs measuring 20 x 5 mm.

On May 5, at Mbanja near Lindi, a ♀ held 5 eggs measuring 24 x 6.5 mm.

On May 18, in the Bangweulu area, a ♀ held eggs, according to Pitman (1936) whose record, apart from my own, appears to be the only dated one in the literature.

Diet. Pitman (1934) remarks that "frogs form an important part of its diet," but I think this is so only when they are young. I have recovered only 7 amphibia (*Bufo r. regularis*; *Leptopelis concolor*; *Megaliralis brachyeuemis* and *Hyperolius p. parkeri*) from 5 snakes, but more than 25 lizards, chiefly geckos (*Hemidactylus b. angulatus*; *H. mabouia*; *Lygodactylus g. grotei*; *L. p. gutturalis*; *L. p. ukereuensis*; *L. p. mombasicus* and *Ablepharus wahlbergii*) from a score of these wood-snakes; a skink (*Mabuya s. striata*) has also been found in one by K. P. Schmidt.

One wood-snake disgorged a gecko (*Pachydactylus b. turneri*) when captured, but so large a species is usually more than they can manage for I found two tails of adult Turner's geckos in another; the lizards themselves having managed to escape by detaching their caudal appendages.

Parasites. Nematodes (*Thubunaea* sp., probably *asymmetrica*) and immature cestodes were present in a Mikindani snake (A.L.).

Enemies. Ionides (1947) observed in the bill of a White-headed Black-chat (*Thamnolaea a. leucolaema*) a foot-long wood-snake which was dropped as he approached; however it succumbed to head injuries very shortly afterwards. I recovered a young one from the stomach of a One-streaked Hawk (*Kaupifalco monogrammicus*), and an adult from a Banded Harrier Eagle (*Circus fasciolatus*).

Defense. Until molested, a Spotted Wood-Snake is apt to rely on its color and build, which, until it moves, usually render the reptile difficult to distinguish from surrounding twigs. At Kilosa I once approached a wood-snake engaged in swallowing a gecko. The predator promptly disgorged its prey and, as I seized its own tail, the snake filled its oesophagus with air so as to vertically distend the entire anterior portion of the body while it repeatedly struck at my hand. Similarly a fine male, captured alive at Chitala, inflated its throat vertically as its photograph was being taken (1953e, pl. iv, fig. 1). This intimidating behavior is shared with sundry other arboreal snakes (*Thrasops* spp., *Dispholidus typus* and *Thelotornis kirtlandii*).

Habits. The slender, lash-like tail is admirably adapted to an arboreal life. By its aid, and taking advantage of every irregularity in the bark, I once saw a wood-snake *ascending* the trunk of a great fig tree on Debasien Mountain. Similarly, my attention being attracted to the reptile by the outcries of some birds, I was able to observe at my leisure a bush-snake *descending* the almost vertical trunk of a tree at Frere Town. At Kitaya I shot a female with truncated tail as it was basking, draped about a knot-hole in the bole of an almost upright tree.

The prehensile qualities of this reptile's tail were demonstrated on another occasion when, in pursuit of a wood-snake I climbed one of the acacias forming part of the avenue leading to Government House, Morogoro. The snake quickly sought refuge in the topmost twigs. When I agitated these the snake flowed swiftly along the branches to the next acacia, in which my African assistant was already ensconced. When the limb on which the snake was travelling was shaken violently, the reptile wrapped itself tightly about the branch but was eventually shaken loose

and fell to the ground twenty feet below. On landing, without a moment's hesitation it made off. I intercepted its departure and was bitten a couple of times, the fine teeth drawing blood.¹¹⁷ However, as Power has said, following the initial fright of capture, this species does not resent handling.

Once, in this same avenue, a bush-snake was found ensconced in the hood of a car parked beneath the acacias, and another time the violence of a blustering gale dislodged a bush-snake from a tree beneath which I happened to be standing.

In a flooded area I found a bush-snake in the company of a *P. i. battersbyi*, the two reptiles having taken refuge in a young doom palm; yet another was among the water plants in waist-deep water where it was presumably hunting frogs. Seemingly they hunt by night as well as by day, for once at 8 p.m. I captured a bush-snake on a spray of bramble when it was only a foot from a tree frog (*Chiromantis xerampelina*) that it was apparently stalking. The bush was growing in knee-deep water, no obstacle to a bush-snake for as Pitman has stated, the species "swims gracefully and with speed."

Habitat. Coastal plain, upland savanna, and montane forest-edge (Loveridge). Young ones were taken in heaps of stones beyond Kurrichane (A. Smith); apparently abundant in palm forest (Cott); living in coffee trees (Uthmöller) and a mango tree (Laurent).

Localities. **Arabia** (*vide* Scortecci:1932b): Yemen. **Sudan:** Bahr el Ghazel; Delami; Gondokoro; Khartoum; *Lake Nyibor; *Mongalla; *Torit. **Eritrea:** Assab (as *irregularis*); Gura. **Ethiopia** (*vide* Scortecci:1943). **British Somaliland:** Bohodle; Golis Mtns.; Haud; Sheikh; Wagar. **Somalia:** Afgoi; Afmadu; Bardera; Belet Amin; Comia to Matagoi; Dolo; Goscia; Kismayu; Lugh; Mada (Madu); Mahaddei Uen; Mofi; Mogadiscio; Villaggio Duca del Abruzzi. **Uganda:** *Abera; *Budongo Forest; Buhukya; *Bundibugyo; *Busingiro; Bussu; Butiaba; *Debasien Mtn.; Kaiso; *Katwe; Kome Id.; Lubwa's, Usoga (1896); Sesse Ids. **Kenya Colony:** *Bura; *Diani Beach; *Jilore; *Kibwezi; Kilibassi; Kurawa; *Lamu Id.; *Malindi; *Manda Id.; *Mbololo Mtn.; Mkonumbi; *Mombasa; *Murri; *Ngatana; *Pecatoni Lake; *Tana River; Teita; Voi. **Tanganyika Territory:**

¹¹⁷ For effect of a bite on an Indian soldier, cf. Loveridge (1942g:120).

*Amboni Estate near Tanga; Arusha; *Bagamoyo; Dar es Salaam; Dunda; Gomberi; Ilonga; Kabare; *Karema; Kibongoto (Kibonoto); *Kigogo; Kilimanjaro Mtn.; *Kilosa; *Kilwa; *Kimamba; *Kipili; *Kitaya; Kizumbe; *Liwale; *Longido Mtn.; *Magrotto Mtn.; *Mangasini; *Manyoni; Masailand; *Matembo; Mavene near Tanga; Mawere Shamba; *Mbanja; *Mikindani; *Mombo; *Morogoro; Moshi; *Mwaya (intermediates); *Siga Caves; *Sigi; Tanga; *Tanganyika Lake; *Tindi; *Tunduru; *Ugogo; *Ukerewe Id.; *Ulambo; Uluguru Mtns.—*Viture; Usambara Mtns.—*Amani, Lewa; *Ujiji; Zanzibar Coast. **Pemba Id.:** *Mangapwami; *Verani; *Wete. **Zanzibar Id.:** Jambiani Id.; Kokotoni; Pete; *Zanzibar. **Mafia Id.:** **Mozambique:** Angoche; Beira; Boro; Cabaceira; Charre; Chifumbazi; Delagoa Bay; Fambani; Inhaminga; *Kasumbadedza; Lukungui; *Lumbo; Mgaza; Mozambique; Quelimane; Querimba Id.; Sofala. **Nyasaland:** Blantyre; *Chitala River; Fort Hill; Karonga to Kondowe; *Likabula River; *Misuku Mtns.; Nyasa Lake; "Nyika Plateau" (Boulenger 1897e); Shire River; Shire Valley. **Northern Rhodesia:** Broken Hill; Kazungula; Livingstone; Luangwa River in Serenje District; Mpika; Petauke; Swamps near Lake Bangweulu; Zambezi Plains. **Southern Rhodesia:** Devuli River Bridge; Eldorado; *Essexvale; Salisbury District; *Umtali; *Victoria Falls. **Bechuanaland Protectorate:** Francistown; Gaberones; Kalahari; Lobatsi; Maun; Metsimaklaba River; *Palapye; Serowe; Tsotsoroga. **Transvaal:** Barberton; Botschabelo; Crocodile and Komati Rivers; *Heeterspruit; Kurrichane; Linokana; Malelane (Malalane); Pretoria District; Shilouwane (Shilouvane). **Natal:** *Durban; Lake Sibaya; Lower Illovo River; Umfolosi Drift; Vryheid. **Cape Province:** Barkly West; Bushman Flat; Douglas; Grahamstown; Pondoland; Port St. Johns; Vaal River Diggings. **Southwest Africa:** Damaraland; Gobabis; Kuibis; Mowange; New Barmen; Okahandja; Orange River; Otjiwarongo; Outjo—north of; Paderburn Farm; Sambiu. Okawango; *Waterberg; Windhoek. **Angola:** Capangombe; Caquindo; Catumbela; Chimporo; Chitau; Cubal; Cuce River; Dundo; *Humbo; Kutato; Maconjo; Quilengues; Vila da Ponte. **Belgian Congo:** Abimva; Akenge; Albertville; Avakubi, Beni; Bugazia; Bukena; Elisabethville; Faradje; Gamangu; Kabenga; *Kabengere; Kando; Kankala River; Kanonga River;

Kapanga; Kapolowe; Kasai; Kasenyi; Kiambi; Kifuko; Kilibi; Kilwezi; Kimbili; Kunungu; Lake Tanganyika; Lofoi; Lubongola; Lubunduy River; Lukafu; Lukonzolwa; Lukuga-Niamba confluence; Lusinga; Mabwe; Makala; Makungu; Maringa; Matale—near Materne Plantation near Bukavu; Medje; Mpala; Musosa; Ngayu; Niangara; Niapu; *Njiani; Sandoa; Stanleyville; Upoto; Uvira. **Belgian Ruanda-Urundi:** Rumonge. ? **Fernando Po:** San Carlos (Bocage:1895c:more probably *s. nitidus*). **French Cameroon:** Sakdje (*vide* Monard). **Nigeria:** *Lagos (specimen bought from dealer: *nitidus* also occurs here). **Dahomey:** Agouagou; Ajuda; Cotonu. **Togo:** Kete (*nitidus* also recorded); Yendi. **Ghana:** Accra; *Adjikpo; *Christian Village; Somanya, Krobo. **Liberia:** *Gbanga; *Suacoco. **Sierra Leone:** Bonthe; Makeni; Njala. **French Guinea:** Beyla; Dixine; Dubreka; Zoubouroumai, 15 miles southeast of Macenta. **Portuguese Guinea:** Bissau (Bissau:*nitidus* also reported); Buba. **Gambia:** McCarthy Island. **French West Africa:** Bandiagara; Lobi (10° 50'N., 5°30'W.).

Range. Practically all Africa south of 16° N. except virgin forest areas bordering the Gulf of Guinea and certain islands therein, also a vague coastal region from southern French Congo to Angola, i.e. the range is from Gambia, east to Eritrea (not recorded from Ethiopia), south to Natal and *adjacent* Cape Province (absent from the Cape Peninsula).

PHILOTHAMNUS SEMIVARIEGATUS NITIDUS (Günther)¹¹⁸

- 1863c. *Ahaetulla nitida* Günther (part), Ann. Mag. Nat. Hist., (3) 11. p. 286: No locality.
 1872a. *Ahaetulla lagoensis* Günther, Ann. Mag. Nat. Hist., (4) 9. p. 26: Lagos, Nigeria.
 1875a. *Philothamnus nigrofasciatus* Bueholz & Peters, Monatsb. Akad. Wiss. Berlin, p. 199: Cameroon.
 1893c. Matschie, p. 212.
 1897. Sjöstedt, p. 35.

¹¹⁸ Here employed in the restricted sense defined in the key. Snakes with 1 + 1 or 1 + 2 temporals occurring well within the range of *s. semivariatus* I regard as sporadic intermediates. However, to avoid complicating or confusing the issue, I have omitted adding to *s. semivariatus* the localities and data derived from the 30 or so individuals from the Central Lake Region assigned to *nitidus* by Laurent (1956), whose remarks should be consulted. I find no such constant frontal differences between the two forms as he suggests.

- 1898a. Werner, p. 209.
 1882c. *Philothamnus lagoensis* Boeage, p. 6.
 1894a. *Philothamnus nitidus* Boulenger, p. 100, pl. v, fig. 4.
 1895. Günther, p. 528.
 1896. Günther, p. 264.
 1897b. Werner, p. 403.
 1898a. Werner, p. 209.
 1899a. Werner, pp. 137, 147, 149.
 1908a. Sternfeld, pp. 408, 425.
 1909a. Sternfeld, p. 15.
 1909b. Sternfeld, p. 15.
 1910. Müller, p. 601.
 1911. Lampe, p. 193.
 1917a. Phisalix, p. 334.
 1919a. Boulenger, p. 282.
 1929a. Werner, p. 99.
 1933f. Angel, p. 110.
 1936. Pitman, p. 45, pl. vi, fig. 3, pl. D, fig. 4.
 1938. Pitman, pp. 39, 97, 100, 101, 179, pls. (as in 1936).
 1906i. *Philothamnus semivariiegatus* Boulenger (not of Smith), p. 213.
 1938b. *Philothamnus semivariiegatus nitidus* Mertens, p. 47.
 1941a. Uthmöller, p. 42.
 1951c. Loveridge (part), p. 11.
 1951. Monard, p. 150.
 1941. *Philothamnus semivariiegatus dorsalis* Witte (not of Boeage), p. 200.

Further citations of "nitidus" will be found under *i. irregularis*, *s. thomensis* and *s. semivariiegatus*.

Common Name. Cameroons Wood-Snake.

Description. Preoculars 1, rarely 2¹¹⁹; postoculars 2, rarely 1¹²⁰; temporals 1 + 1, 1 + 2 or 2 + 2; upper labials 8-9, the fourth, fifth and sixth, rarely the fifth and sixth only, entering the orbit; lower labials 10-11, the first 5 or 6 in contact with the anterior sublinguals. Midbody scale-rows 15; ventrals 153-

¹¹⁹ 2 preoculars in the type of *nigrofasciatus* (fide Buchholz & Peters).

¹²⁰ On right side only in one of the cotypes of *nitidus* (B.M. 46.1.10.28).

164 (♂♂ 153-162; ♀♀ 154-164¹²¹); anal divided; subcaudals 133-153 (♀♀ 133-151; ♂♂ 136-153¹²²).

For characters common to all species, and synopsis of scale-counts, see pp. 49-52, 55.

Color. Above, dark green. Below, chin and throat white; otherwise pale green.

Size. Length of ♂ (M.C.Z. 17564) 986 (610 + 376) mm., from Sakbayeme; length of ♀ (B.M. 08.5.30.17) 964 (620 + 344) mm., from Biteye.

Remarks. Apparently a virgin-forest form that centered in the Cameroons but is being supplanted by the typical savanna-dwelling race as the savanna encroaches on the primary forest. As a consequence occasionally both races may be recorded from one locality.

Localities. **French Congo:** *Benito River; *Lambarene, Ogooue River. **French Cameroon:** *Assobam; *Biteye; *Ja River District; *Kribi; Mukonje Farm, Mundame; Pungo Songo; *Sakbayeme. **British Cameroon:** Bibundi; Mowange near Mubenge; Victoria; Yaunde. **Nigeria:** *Lagos. **Togo:** Adele (Bismarekburg); Kete. **Ghana:** Accra; *Achimota.

Range. Virgin forests of French Congo, north through the Cameroons, west to Ghana.

PHILOTHAMNUS SEMIVARIEGATUS DORSALIS (Bocage)

- 1866a. *Leptophis dorsalis* Bocage, Journ. Sci. Lisboa, 1, pp. 48, 69: Molembo, Loango Coast, Angola (restricted by Bocage:1882c).
 1866b. Bocage, p. 69 (this is reference to full description).
 1867a. Bocage, p. 226.
 1876a. *Philothamnus dorsalis* Peters, p. 119.
 1877c. Peters, p. 620.
 1882c. Bocage, p. 9, fig. 3.
 1884b. Sauvage, p. 201.
 1887a. Bocage, p. 185.
 1888a. Boettger, p. 58.
 1894a. Boulenger, p. 101.

121 162 (not 165 as stated by Günther) in the cotype of *nitidus*.

¹²² "153" in cotype of *nitidus* is now actually 151+, the tail tip being lost. These figures are all in the restricted sense of the *Range*; Belgian Congo specimens referred to *nitidus* by Schmidt (1933:78), and formerly considered as "intermediates" by me (1951c:5) on account of their temporal arrangement, are really *s. semivariiegatus*.

- 1895a. Bocage, p. 92, pl. xiii, figs. 1a-c.
 1896d. Boulenger, p. 631.
 1897a. Bocage, p. 200.
 1897b. Boulenger, p. 278.
 1897b. Mocquard, p. 12.
 1898. Boettger, p. 59.
 1898. Ferreira, p. 244.
 1900b. Boulenger, p. 452.
 1915a. Boulenger, p. 206.
 1919a. Boulenger, p. 282.
 1923. Schmidt, p. 78.
 1929a. Werner, p. 99.
 1933m. Witte (part), p. 89.
 1937b. Monard, p. 114.
 1940. *Philothamnus semivariegatus dorsalis* Bogert, p. 56.
 1941a. Uthmüller, p. 42 (omit).
 1951c. Loveridge, pp. 5, 11.
 1953. Witte, p. 198, fig. 58 (omit localities).

Further citations of "*dorsalis*" will be found under *hoplogaster*, *s. nitidus* and *s. semivariegatus*.

Common Names. Striped Wood-Snake (English); *chitelle* (S. Salvador:Bocage); *lubio* (Benguela:Bocage); *tando* (Rio Dande:Bocage).

Description. Preocular 1; postoculars 2, rarely 3; temporals almost always 1 + 1, very rarely 2 + 2 or 2 + 3; upper labials 9, rarely 8,¹²³ the fourth, fifth and sixth, rarely fourth and fifth only,¹²⁴ entering the orbit; lower labials 10-11, the first 5 in contact with the anterior sublinguals. Midbody scale-rows 15; ventrals 167-190¹²⁵ (♂♂ 167-190; ♀♀ 172-180); anal divided; subcaudals¹²⁶ 115-143 (♀♀ 115-137; ♂♂ 128-143).

Color. Above, snout usually yellowish brown, rest of head and body light green, bronzy green or olive, with a series of brown or black crossbars on nape and anterior part of back, usually

¹²³ Eight, through obvious fusion, in an Angolan ♀ (B.M.73.7.28.9).

¹²⁴ *Fide* Boulenger (1896d), checked on above mentioned ♀.

¹²⁵ Bogert (1940).

¹²⁶ This is my lowest count for a perfect tail, the specimen with 110 referred to by Bogert (1940) has a regenerated tip; a few other records under 115 have been rejected pending confirmation; 143 has been verified by a Carangigo ♀ in the British Museum.

followed by an olive brown vertebral stripe extending to tip of tail, usually many scales display a pale blue or white streak either with or without black edging. Below, labials, chin and throat yellow or white; rest of underside greenish white to yellow, usually a dusky or brownish line along the ventral keels.

Boulenger (1897b) records a specimen from Zambesi, lower Congo River, with pale brown snout and white throat, but otherwise uniformly black. I have seen both these Zambesi snakes (97.1.30.5-6) in the British Museum. Mocquard (1897b) mentions a Lambarene reptile in which the vertebral band was barely distinguishable. Possibly both French Congo specimens should be regarded as intermediates, or identical with *nitidus* which so often has a temporal arrangement like *dorsalis*.

Size. Length of ♂ (A.M.N.H. 51787) 890 (618 + 272) mm.; length of ♀ (B.M. 73.7.28.9) 857 (565 + 292) mm.

Remarks. It is somewhat difficult to say what should be done with the 22 snakes from Mwaya, Lake Nyasa, that I (1933h:238) previously assigned to *dorsalis* on account of their temporal arrangement being overwhelmingly of that form (cf. p. 239). In coloration they were seemingly indistinguishable from that of typical *semivariegatus* with which they are apparently surrounded. In their subcaudal counts they occupy an intermediate position, though this character may be influenced by the proportion of ♂♂ to ♀♀. In this connection the following figures are possibly of interest:

Subcaudals of 15 *dorsalis* from Lower Congo 115-136, average 122.

Subcaudals of 19 *dorsalis* from Angola 127-143, average 132.

Subcaudals of 22 snakes from Mwaya 135-156, average 144.

Subcaudals of *semivariegatus* from Africa 126-162.

It seems advisable to regard the Mwaya snakes as an isolated strain of intermediates and list them under the typical form. If only all Angolan "*semivariegatus*" could be assembled for critical study, doubtless other adjustments might be made. For example, the ♂ holotype of *bocagii*, though with *semivariegatus* coloring, tends to be intermediate in temporal arrangement, and provides the lowest subcaudal count (126) of all *semivariegatus*.

Dentition. Similar to that of the typical form, 20 teeth being present on the maxilla of each of two Angolan snakes examined by Bogert (1940).

Hemipenis. Not bifurcate; sulcus spermaticus simple; basal spines well developed, followed distally by 3 or 4 flosses merging on the middle third into reticulate calyces which grade into papillae towards the tip, which extends to the eighth caudal (Bogert).

Localities. **Angola:** *Benguela; Caconda; *Carangigo; Catumbela; Dombe; Dondo; Duque de Braganca; Loanda; Molembo; Pungo Andongo (Adungo); Rio Dande. **Cabinda:** Cabinda. **Belgian Congo:**¹²⁷ Banana; *Boma; Kunungu; Lower Congo River; Povo Nemlao; Sandoa; Vista; *Zambi. **French Congo:** About 7° N., 16° E. (B.M. 18.11.12.24); Lambarene (1897b); Ogooue (Ogowe:1876a).

Range. Angola, north along the coast to the Portuguese, Belgian and French Congo.

PHILOTHAMNUS SEMIVARIEGATUS GIRARDI Bocage

- 1893a. *Philothamnus Girardi* Bocage, Journ. Sci. Lisboa, (2) 3, p. 46: "Anno-Bom," i.e. Annobon Island, Gulf of Guinea.
- 1893b. Bocage, p. 47.
- 1893d. Bocage, p. 143.
- 1894a. Boulenger, p. 102.
- 1895a. Bocage, p. 95.
- 1897a. Bocage, p. 200.
- 1903a. Bocage, p. 59.
- 1906i. Boulenger, p. 213.
1917. Sternfeld, p. 471.
- 1919a. Boulenger, p. 282.
- 1929a. Werner, p. 99.
1940. Bogert, p. 57.
- 1934c. *Philothamnus semivariiegatus girardi* Mertens, pp. 27, 83, 118, 119.
- 1951c. Loveridge, p. 10.

¹²⁷ The alleged "*dorsalis*" from Lukafu on being examined by me proved to be a *hoplogaster*; the Kimbili and Lubongola snakes have been referred to *s. nitidus*, while, on geographical grounds, the snake from Faradje (in the extreme north-east Belgian Congo) must be considered as a *s. semivariiegatus*.

The Boma ♂ (now M.C.Z. 42945), identified as *dorsalis* by de Witte, while possessing the yellow-brown snout, habitus and scale-counts (176 ventrals; 128 subcaudals; verified) lacks the subcaudal keeling and notching of the *semivariiegatus* group. The number of its ventrals and subcaudals are within the range of *s. semivariiegatus*, or *heterolepidotus*, but are rather higher than in *i. irregularis*.

Common Name. Annobon Wood-Snake.

Description. Preoculars 1, rarely 2; postoculars 2; temporals 1 + 1 or 1 + 2; upper labials 9-10, the fourth, fifth and sixth, or fifth, sixth and seventh, entering the orbit; lower labials 10, the first 5 in contact with the anterior sublinguals. Midbody scale-rows 13; ventrals¹²⁸ 185-197 (♀ 185); anal divided; subcaudals 143-160 (♀ 143).

For characters common to all species, and synopsis of scale-counts, see pp. 49-52, 55.

Color. Above, olive green, with a longitudinal series of cross-bars on nape and anterior part of back and occasionally some scales bearing a black-edged white spot. Below, greenish white or yellowish, the ventral keels black; tail bluish green.

Size. Total length (Bocage Mus.) 910 (595 + 315) mm.; length of a cotype ♀ (B.M. 46.1.6.3) 736 (480 + 256) mm.

Remarks. Known to me from a ♀ cotype (which I have examined) and the literature. This insular race is separable on its 13 midbody scale rows, a condition that is extremely rare in the continental *s. semivariiegatus*.

Locality. Annobon Island.

Range. Annobon Island, Gulf of Guinea.

PHILOTHAMNUS SEMIVARIEGATUS THOMENSIS Bocage

- 1863c. *Ahaetulla nitida* Günther (part), p. 286: "Demarara" (error) specimen only.
- 1879a. *Philothamnus irregularis* Bocage (not Leach), p. 87.
1885. Greef, 1884, p. 48.
- 1882b. *Philothamnus thomensis* Bocage, Journ. Sci. Lisboa, 8, p. 302: Sao Tomé Island, Gulf of Guinea.
- 1882c. Bocage, p. 11, fig. 4.
- 1886a. Bocage, p. 69.
1886. Vieira, p. 237.
1892. Bedriaga, pp. 901-903 (as *Phyllothamnus*).
- 1893d. Bocage, p. 143.
- 1894a. Boulenger, p. 101.
- 1895a. Bocage, p. 94.
1898. Boettger, p. 59.

¹²⁸185 in the cotype (B.M. 46.1.6.3) which is a ♀, not a ♂ as stated by Boulenger (1894a:102).

1905. Bocage, p. 93.
 1906i. Boulenger, p. 213.
 1917. Sternfeld, p. 470.
 1919a. Boulenger, p. 282.
 1920a. Angel, p. 199.
 1929a. Werner, p. 99.
 1941. Themido, p. 6.
 1934e. *Philothamnus semivariiegatus thomensis* Mertens, pp. 27, 77, 91, 118, 119.
 1940. Bogert, p. 57.
 1951e. Loveridge, pp. 5, 10.

Further citations of "*thomensis*" will be found under *s. semivariiegatus*.

Common Names. Sao Tome Wood-Snake (English); *soasoa* (Vieira:1886).

Description. Preocular 1; postoculars 2, rarely 3; temporals 1 + 1 or 1 + 2, rarely 2 + 1; upper labials 9, the fourth, fifth and sixth, or fifth and sixth only, entering the orbit; lower labials 10, the first 5 or 6 in contact with the anterior sublinguals. Midbody scale-rows 15; ventrals 200-220 ($\delta \delta$ 209-212; 206-210); anal divided; subcaudals 156-175 ($\eta \eta$ 164-168; δ 174).

For characters common to all species, and synopsis of scale-counts, see pp. 49-52, 55.

Color. Above, olive green, loreal region blackish; body uniform but the edges of the scales darker, no white spots. Below, lips and throat yellowish, otherwise pale green, the ventral keels sometimes brown.

Size. Total length of δ (B.M. 93.12.27.17) 942+ (630 + 312+) mm.; length of a η (B.M. 06.3.30.76) 1242+ (825 + 417+) mm. Bogert's (1940) data disproves Bocage's idea that the tail length is diagnostic.

Remarks. Bedriaga's (1892) findings are ignored for the reasons stated by Bocage (1893d). The arguments advanced by Bogert (1940) for accepting Merten's action in reducing this insular form to subspecific rank are sound, and followed here.

Breeding. In June a η held 5 eggs measuring about 37 x 8 mm. (Bogert).

Habitat. Occurs in coffee trees (Vieira).

Localities. **Sao Tome Island:**—Binda; Iogo-Iogo Islet; Obovermelho; Praia Quijo; Rodio Islet; Sandada Islet; *Vista Alegre.

Range. Sao Tome Island and surrounding islets, Gulf of Guinea.

Genus PROSYMNA Gray

1849. *Prosymna* Gray, Cat. Snakes Brit. Mus., p. 80. Type by monotypy: *Calamaria meleagris* Reinhardt.
1849. *Temnorhynchus* A. Smith (not Hope), Ill. Zool. S. Africa, Rept., App., p. 17. Type by monotypy: *T. sundevallii* A. Smith.
1863. *Ligonirostra* Cope, Amer. Journ. Sci. Arts, (2) 35, p. 457: new name for *Temnorhynchus* Smith (preoccupied in coleoptera).
- 1896b. *Asthenophis* Boulenger, Ann. Mus. Civ. Stor. Nat. Genova, (2) 17, p. 12. Type by monotypy: *A. ruspollii* Boulenger.
1902. *Pseudoprosymna* Lindholm, in Lampe, Jahrb. Nassau Ver. Naturk. (Wiesbaden), 55, p. 57. Type by monotypy: *P. bergeri* Lindholm = *Temnorhynchus frontalis* Peters (part).
- 1909c. *Stenorhabdium* Werner, Jahres. Ver. Nat. Württemberg, 65, p. 59. Type (lost ?) by monotypy: *S. temporale* Werner.

Definition. Maxillary teeth 7-11, the foremost minute, the rest increasing in size posteriorly to the last 3, which are large, strongly compressed, lancet-like; palatal teeth minute, vestigial or absent; mandibular teeth few, very small, subequal. Head not distinct from neck, snout strongly depressed, projecting, with angular or sharp horizontal edge; eye relatively small, with vertically subelliptic pupil; nasal semidivided by a (sometimes interrupted or absent) horizontal suture extending from the nostril to the loreal; a preocular (usually single, occasionally absent); internasal single or paired; prefrontal usually single. Body cylindrical, short; scales smooth or keeled, with apical pits in 15-21 rows; anal entire. Tail short, terminating in a horny spine; subcaudals paired.

Range. Africa, in suitable terrain, south of 17° N.

Remarks. *Asthenophis* Boulenger was based on a juvenile snake whose maxillary teeth were believed to be subequal. Until this observation can be confirmed on a cleaned skull, it is best to regard it as not proven in view of the fact that the snake

differs in no other respect from *Prosymna* whose range at the time *Asthenophis* was described was supposedly remote from Somaliland.

Pseudoprosymna was suggested by Lindholm for a pair of snakes in which the horizontal nasal suture from the loreal failed to reach the nostril. This character is not even of specific significance since Mertens (1955a) has found it to be inconstant in *frontalis* (of which *bergeri* is considered a synonym).

Stenorhabdium was based by Werner on a single shrivelled snake of indefinite locality. I suggest that its condition masked its true appearance and resulted in some erroneous interpretations of what may have been a slightly aberrant *stuhlmanni*. Twenty-five years ago when I wished to see the holotype, it could not be found.

In some respects *Pocillopholis* Boulenger (1903, Ann. Mag. Nat. Hist., (7) 12, p. 352) appears to be an offshoot of *Prosymna*. However, the type species *cameronensis* (*sic*) from Efulen, French Cameroun, lacked both supranasals and loreal, the nasal being in contact with the single preocular. Furthermore its anal shield was divided. The holotype was said to have 178 ventrals and 23 subcaudals.

In all *Prosymna* species the rostral is very large and broad, its edge often slightly upturned and more acute in old snakes, an age characteristic that has misled several herpetologists into describing as new the young or old, as the case may be. Nevertheless members of the genus fall into two groups, for in those of the *sundevallii* section the anterior edge of the rostral is sharply blade-like, rather than acutely angular. I have omitted reference to the frontal width in relation to head-width, for in several species they are subequal, the frontal being sometimes slightly more or slightly less than half the head-width; similarly it may be as long as, or slightly longer than, the parietals. In all species the single pair of enlarged sublinguals is followed by three elongate scales which are not considered as sublinguals.

Owing to the paucity of characters and the overlapping of scale-counts (more especially among the numerous races of *P. ambigua*) the construction of a satisfactory key has proved impossible. Under the circumstances those endeavoring to use it should have recourse to the geographical probabilities (cf. chart

on p. 134) and synoptic tables of statistical data — always bearing in mind that *the restricted ranges of many species* merely reflect the fact that very few individuals are known, and the ranges are *certain to be expanded* as our knowledge increases.

*Key to the Species*¹²⁹

1. A pair of internasals 2
 A single bandlike internasal (very rarely divided) 6
2. Internasals separated 3
 Internasals in contact 4
3. On either side a dorsolateral series of brown and black spots, also a vertebral one in which the center of each scale is yellowish or grayish white; ventrals 130-169; range: South Africa (Transvaal; Natal; Cape Province) *s. sundevallii* (p. 131)
 On either side a dorsolateral, white-flecked, brown line 3 scales in width (*bivittata*), or both dorsolateral and a vertebral series of dark brown spots (*macrospila*); ventrals 159-181; range: Cape Province (Little Namaqualand) north to Southwest Africa (Okahandja)
 *s. bivittata* (p. 136)
4. Prefrontals paired; postocular 1; range: French Sudan, French West Africa *greigerti* (p. 139)
 Prefrontal single (rarely divided); postoculars 2 (rarely 1) 5
5. Ventrals 114-144; subcaudals 23-38; range: British Somaliland
 *somalica* (p. 140)
 Ventrals 155-169; subcaudals 18-20; range: Mozambique and Southern Rhodesia *lineata* (p. 138)
6. Midbody scales keeled, in 15-17 rows; range: Mozambique (Inhambane) south to Natal (Kosi Bay, Zululand) *jani* (p. 165)
 Midbody scales smooth, in 15-21 rows 7
7. Midbody scales in 19-21 rows; ventrals 140-157; subcaudals 17-27; range: southeast Tanganyika Territory *pitmani* (p. 167)
 Midbody scales in 15-17 rows 8
8. Upper labials normally 5 (*rarely* 6), the second and third (*rarely* the third and fourth) entering orbit 9
 Upper labials normally 6 (*rarely* 5 or 7), the third and fourth (*rarely* the second and third, or second, third and fourth) entering orbit 10

¹²⁹ Before using, be sure to read preceding paragraph.

9. Ventrals in ♂♂ 151-160, in ♀♀ 170-184; subcaudals in ♀♀ 21-25, in ♂♂ 33-36; size larger; range: southern Sudan west through *northern* Nigeria to Senegal *m. laurenti* (p. 141)
 Ventrals in ♂♂ 137-150, in ♀♀ 155-166; subcaudals in ♀♀ 19-23, in ♂♂ 31-36; size smaller; range: *southern* Nigeria west through Ghana, possibly to the Ivory Coast or even Sierra Leone *m. melcagris* (p. 145)
10. Ventrals 160-188; subcaudals 34-51; range: western Cape Province (Little Namaqualand) north to Southwest Africa *frontalis* (p. 147)
 Ventrals 127-168; subcaudals 15-40; range outside of Little Namaqualand and Southwest Africa 11
11. Back *normally* with two longitudinal series of blackish spots; ventrals in ♂♂ ?145-155; ♀♀ ?155-163; subcaudals in ♀♀ ?16-19; ♂♂ ?25-28; range: Southwest Africa north to southwest Angola *angolensis* (p. 149)
 Back without longitudinal series of paired spots, normally the apex of each scale bearing a light spot 12
12. Subcaudals in ♀♀ 15-24; ♂♂ 25-34; range: Western Africa and Uganda 13
 Subcaudals in ♀♀ 19-28; ♂♂ 29-40; range: Eastern Africa and Transvaal 16
13. Ventrals in only known ♂ of 152; subcaudals 32; range: Belgian Runda-Urundi *a. urundiensis* (p. 156)
 Ventrals in ♂♂ 148 or less; subcaudals 25-34 14
14. Ventrals in ♂♂ 139-148; ♀♀ 161-168; range: southern Sudan and Uganda west to *northern* Belgian and French Congo *a. bocagii* (p. 154)
 Ventrals in ♂♂ 127-140; ♀♀ 140-154 15
15. Subcaudals in ♀♀ 19-24; ♂♂ 26-34; range: northwest Angola to southwest Belgian and French Congo *a. ambigua* (p. 151)
 Subcaudals in ♀♀ 15-17; ♂♂ 25-30; range: northeast Angola to southeast Belgian Congo *a. brevis* (p. 157)
16. Body with a series of scarlet blotches or crossbands; subcaudals in ♂♂ 35-40; range: Uluguru Mountains, Tanganyika Territory *a. ornatissima* (p. 159)
 Body without any scarlet markings; subcaudals in ♂♂ 29-37 17

17. Ventrals in ♀♀ 155-158; subcaudals in ♀♀ 22-25; range: Transvaal
 *a. transvaalensis* (p. 164)¹³⁰
 Ventrals in ♀♀ 143-155; subcaudals in ♀♀ 19-28 18
18. Subcaudals in ♂♂ 29-34; above gray or plumbeous, uniform or with
 a dorsolateral series of white flecks; range: Kenya Colony south to
 Zululand, Natal *a. stuhlmanni* (p. 160)
 Subcaudals in ♂♂ 32-37; above dark reddish to purplish brown; usually
 a light spot on the apex of each scale; range: Somalia
 *a. ruspolii* (p. 158)

That a burrowing genus like *Prosymna* has been reported from "Zanzibar" alone of the ten major islands off the coasts of tropical Africa, suggests that the specimen in question came from the opposite littoral, to which the name Zanzibar was formerly applied rather loosely. More surprising is the fact that no member of the genus has been recorded from Eritrea, Ethiopia, French Somaliland, Bechuanaland, Cabinda, Rio Muni or Liberia.

PROSYMNA SUNDEVALLII SUNDEVALLII (Smith)

1849. *Temnorhynchus Sundevallii* (sic) A. Smith, Ill. Zool. S. Africa, Rept., app. p. 17; Kafirland, eastward of Cape Colony, i.e. Cape Province, Union of South Africa.
- 1887h. Boulenger, p. 175.
- 1858c. *Rhinostoma capreum* Günther, Cat. Colubrine Snakes Brit. Mus., p. 9: Africa.
- 1894a. *Prosymna sundevallii* Boulenger, p. 247.
1895. Jeude, p. 229.
- 1896c. Bocage, p. 119.
1898. Slater p. 99.
1898. Werner, p. 144.
- 1907c. Roux, p. 735.
1908. Gough, p. 24.
- 1910b. Boulenger (part), p. 508 (omit L. Namaqualand?).
1910. Lönnberg, p. 5.
1912. FitzSimons, F. W., p. 88.
1913. Hewitt & Power, p. 162.
- 1916g. Chabanaud, p. 438.

¹³⁰ *P. a. transvaalensis* Hewitt appears doubtfully distinct, possibly nearer to *a. ambigua* than to *a. stuhlmanni*; geographically it occupies an intermediate position.

STATISTICAL DATA FOR THE SPECIES OF *PROSYMA*

Species or race	Scales	Internasal	Pre-ocular	Post-oculars	Temporals
<i>s. sandevallii</i>	15	2 separate	1	2-3	1+2 1+3 2+2 2+3
<i>s. bivittata</i>	15	2 separate	1	2	1+1 1+2 2+3
<i>lineata</i>	15	2 contact	1	2	1+2 2+2
<i>greigerti</i>	15	2 contact	1	1	1+2
<i>somalica</i>	15	2 contact	1-2	1	1+2
<i>m. laurenti</i>	15	1 rarely 2	1	1-2	1+1 1+2 1+3 2+2
<i>m. melaenensis</i>	15	1	1	1	1+1 1+2 1+3
<i>frontalis</i>	15	1	1	1-2	1+2
<i>angolensis</i>	15	1	1	1-2	1+2
<i>a. ambigua</i>	15-17	1	1	1-2	1+1 1+2 2+2
<i>a. brevis</i>	15	1	1	1-2	1+2
<i>a. bocagii</i>	15	1	1	1-2-3	1+1 1+2 2+2
<i>a. urundensis</i>	15	1	1	2	1+2
<i>a. ruspolii</i>	15	1	1	1	1+2
<i>a. ornatissima</i>	15	1	1	0-1-2	1+2
<i>a. stuhlmanni</i>	15	1	0-1	0-1-2	1+1 1+2 1+3 2+2
<i>a. transvaalensis</i>	15	1	1-2	0-1-2	1+1 1+2 1+3 2+3 ¹³¹
<i>jani</i> (keeled)	15-17	1	1	2-3	1+2
<i>pitmani</i>	19-21	1	1-2	2	1+2 2+2

131 Not 1 + 3 but 2 + 3 in paratype, *fac.* FitzSimons (10.v.57).

Species or race	♂♂ ventrals	♀♀ ventrals	♀♀ subcaudals	♂♂ subcaudals	Maximum length ¹³²	
					♂♂	♀♀
<i>s. sandetvalli</i>	1130-155	1155-169	119-27	28-38	230+35	280+30
<i>s. bivittata</i>	1159-167	1178-181	122-23	25-29	221+24	315+27+
<i>lineata</i>		155-169	18-20			259+23
<i>greigeri</i>		168	18			159+13
<i>somatica</i>	114-126	132-144	23-29	30-38	154+39	104+15
<i>m. laurenti</i>	151-160	170-184	21-25	33-36	238+42	332+28
<i>m. melanogris</i>	137-150	155-166	19-23	31-36	220+37	255+24
<i>frontalis</i>	160-169	180-188	34-38	48-51	244+56	312+43
<i>angolensis</i>	1145-155	1155-163	116-19	25-28		331+29
<i>a. ambigua</i>	129-140	145-154	19-24	26-34	237+46	313+32
<i>a. brevis</i>	127-136	140-146	15-17	25-30	267+48	325+26
<i>a. bocagii</i>	139-148	161-168	17-21	27-32	250+48	366+32
<i>a. arundinensis</i>	152			32	199+36	
<i>a. ruspolti</i>	130-136	143-154	23	32-37	165+33	262+33
<i>a. ornaticissima</i>	127-132	150	27	35-40	242+55	252+34
<i>a. stuhlmanni</i>	129-144	144-155	19-28	29-34	200+38	293+30
<i>a. transvaalensis</i>		155-158	24-26			255+25
<i>jani</i> (keeled)	1113-119			30-37	188+36	
<i>pitmani</i>	140-151	155-157	17-20	25-27	275+34	285+23

¹³² Maximum lengths are given in millimetres, first of the head and body, then that of the tail; added together they give the total length. Where a question mark (?) precedes figures it denotes that the sex is assumed, at least in part owing to the sex having been omitted by the describer. Sexual dimorphism being so strongly marked in this genus, the assumption has usually a sound basis.

1929. Flower, p. 218.
 1929a. Werner, p. 141.
 1937a. FitzSimons, V. F., p. 262.
 1946a. FitzSimons, V. F., p. 355.
 1950. Rose, p. 320, fig. 10.
 1955. Rose, pp. 96, 178, fig. 10 (reprinted).

Further citations of "*sundevallii*" will be found under *s. bivittata* and *meleagris*.

Common Name. South African Shovel-snout (A.L.); Coppery Snake (F. W. FitzSimons).

Description. Rostral with sharp horizontal edge; internasals separated, occasionally in contact by their inner angles;¹³³ prefrontal single, rarely divided¹³³; frontal large; loreal as long as high or slightly higher; preocular 1; postoculars 2-3; temporals rarely 1 + 2 or 1 + 3, usually 2 + 2 or 2 + 3; upper labials 6-8, the third and fourth, rarely fourth and fifth entering the orbit; lower labials 7-8, the first 3 in contact with the single pair of sublinguals. Midbody scales smooth, in 15 rows; ventrals 130-169¹³⁴ (assumed ♂♂ 130-155; assumed ♀♀ 155-169); anal entire; subcaudals 19-38 (assumed ♀♀ 19-27; definite ♂♂ 28-38).

Color. Above, rostral and crown yellowish white, or head yellowish with a more or less distinct dark brown interocular band and a dark brown crescentic blotch bordering the parietals posteriorly; body pale gray to reddish brown, sometimes each scale edged with darker, the center of each vertebral scale yellow or grayish white, on either side a dorsolateral series of small brown or black spots extend along the back. Below, white or yellowish, uniform or with dusky blotches and a reddish median line along the tail.

Size. Length of ♂ (M.C.Z. 21243) 265 (230 + 35) mm., from Sunnyside; length of ♀ (M.C.Z. 21244) 310 (280 + 30) mm., from Meintjeskop, both localities being near Pretoria.

Remarks. Sir A. Smith, whose scale counts were often erroneous, states that the type had 169 ventrals, a figure I should be

¹³³ *vide* Boulenger (1894a), possibly by inclusion of mistakes in the literature.

¹³⁴ Omitted are the figures of a juvenile recorded by Boulenger (1894a) as having 125 ventrals and 27 subcaudals.

inclined to question as it is 5 more than found on any subsequently recorded specimen. However, FitzSimons (1937a) reports that a specimen in poor preservation, but corresponding to the type in lepidosis and measurements, is among the Smith collection in the Royal Scottish Museum, Edinburgh.

Localities. **Transvaal:** Assegaibos; Brakkloof; Crocodile-Komati (Comati) River Junction; Harts River; Krabbefontein; *Meintjeskop; *Sunnyside. **Natal:** Durban. **Cape Province:** Burgersdorp; Clanwilliam; Fort Richmond; Graaf Reinet; Hanover; Kaffirland; Orange River; Tulbagh.

Range. Union of South Africa, from the Transvaal southwest to Little Namaqualand where it meets with *sundevallii bivittata* (including *macrospila*).

PROSYMNA SUNDEVALLII BIVITTATA Werner

- 1867b. *Temnorhynchus frontalis* Peters (part: not Peters 1867b), p. 236, pl. —, figs. 2-2d: Southwest Africa.
- 1902a. *Prosymna sundevallii* Werner (not Smith), p. 339.
- 1910b. Sternfeld, p. 20, fig. 20.
- 1915c. Werner, p. 360.
- 1929a. Werner, p. 141.
1903. *Prosymna sundevallii* var. *bivittata* Werner, Abhand. König. Bayer. Akad. Wiss., **22**, p. 381: Africa south of the Orange River, i.e. Little Namaqualand.
- 1910a. Werner, p. 327.
- 1915c. Werner, p. 360.
- 1916g. Chabanaud, p. 439.
- 1955a. Mertens, p. 95.
- 1910a. *Prosymna sundevallii* var. *macrospila* Werner, Denkschr. Med.-Nat. Ges. Jena, **16**, p. 357: Steinkopf, Little Namaqualand.

Common Name. Two-striped Shovel-snout (A.L.).

Description. As in the typical form, with prefrontal single, rarely divided¹³⁵; temporals 1 + 2, 2 + 2, or 2 + 3¹³⁶; ventrals 159-181; subcaudals 22-29. This form agrees with *s. sundevallii* in having widely separated internasals, but approaches *frontalis* in its high ventral count.

¹³⁵ Divided in the adult mentioned by Werner (1910a); confirmed by Mertens (1955).

¹³⁶ 2 + 3 in the holotype of *macrospila*.

Color of var. bivittata. Above, an interocular brown band and a transverse, hourglass-shaped, dark brown blotch on the nape from which there extends backwards a pair of parallel, white-flecked, brown lines three scales in width; on either flank the three outermost rows of scales are white. Below, white, uniform.

Color of var. macrospila. Above, head yellowish, a brown band across the nasals and prefrontal; also brown are the anterior borders of the frontal and supraoculars in addition to a spot under either eye; body yellowish, a vertebral series of angularly shaped, or obliquely elliptical, dark brown spots, a dorsolateral series of similar spots along the back. Below, whitish, uniform.

Essexvale ♀ with 181 ventrals. Above, dark purplish brown; rostral lighter; upper labials cream colored; frontal with a dull orange (turned brown in alcohol) blotch; parietals with smaller blotches; back with a vertebral stripe three scales in width but interrupted by numerous X or V-shaped purplish brown markings; lower flanks have the outermost $1\frac{1}{2}$ or 2 scale rows cream colored. Below, cream colored, uniform. Based on notes made from this snake in life by D. G. Broadley.

Size. Length of ♂ (S.M.F. 32542) 245 (221 + 24) mm., from "Deutsch-Südwestafrika"; largest ♀ (S.R.M. 635) 342+ (315 + 27+) mm., from Essexvale; length of *bivittata* type (presumably an adult ♀) 296 (275 + 21) mm.; length of *macrospila* type (presumably a juvenile ♀) 156 (141 + 15) mm.

Remarks. As suggested by its size, *macrospila* may represent the juvenile coloring for Werner (1910a) clearly states that he regards it as but another color variety, saying he has both varieties from Steinkopf. In the same paper he mentions three *bivittata*, the most northerly example coming from Okahandja. Mertens (1955), who rightly recognizes the race, has also seen three specimens of it. The only one I have handled is from Essexvale, the first record from Southern Rhodesia, where it was collected by D. G. Broadley.

Localities. **Southern Rhodesia:** *Essexvale. **Little Namaqualand:** South of Orange River (*bivittata* type); Steinkopf (*macrospila* type). **Southwest Africa:** Okahandja; Otjimbingue; Windhoek.

Range. Southern Rhodesia, west to Little Namaqualand, north to Damaraland, Southwest Africa.

PROSYMNA LINEATA (Peters)

- 1871a. *Tennorhynchus lineatus* Peters, Monatsb. Akad. Wiss. Berlin, p. 568: Matlale, Gazaland, Mozambique.
1882a. *Prosymna frontalis* Bocage (part: not Peters), p. 288.
1895a. Bocage, p. 99.
1896a. *Prosymna Sundevallii* (sic) Bocage (not Smith), p. 92
1953e. *Prosymna lineata* Loveridge, p. 264.

Common Name. Mozambique Shovel-snout (A.L.).

Description. Rostral with sharp horizontal edge; separated by a pair of internasals (that are broadly in contact) from the single bandlike prefrontal; frontal large; loreal as long as high; preocular 1; postoculars 2; temporals 1 + 2, 2 + 2 or 2 + 3; upper labials 5-6, the third and fourth entering the orbit; lower labials 8, the first 3 in contact with the single pair of sublinguals. Midbody scales smooth, in 15 rows; ventrals 155-169 (♀ ♀ 155-169); anal entire; subcaudals 18-20 (♀ ♀ 18-20).

Color. Above, head brown with black markings on the prefrontal; body dark violet brown, some scales edged with black and others flecked with white and coalescing to form a ladderlike pattern on the dorsum. Below, yellowish white, uniform.

Juvenile ♀ from Plumtree. Above, pale gray; internasals with a black crossbar; prefrontal with a spectacle-like crossbar as its extremities encircle the orbits; frontal with a black spot posteriorly; a black, T-shaped, nuchal marking; dorsum and tail with a series of irregular, light-edged, dark blotches that do not coalesce with the ill-defined line that flanks them. Below, white, uniform.

Size. Length of holotype ♀ (Berlin Mus.) 282 (259 + 23) mm. In the figures furnished by Peters there was a major (probably printer's) error; I am indebted to Dr. Heinz Wermuth for those given above. That this was a very large *Prosymna* was obvious from the head length—9 (not 11) mm., and body diameter of 9 mm.; length of juv. ♀ (S. R. Mus.) 130 (120 + 10) mm., from Plumtree.

Remarks. Peters rightly compared his new species to *frontalis*, with which Bocage erroneously synonymized it. Boulenger overlooked *lineata* altogether. I obtained the third known example (M.C.Z. 51144) under the peculiar circumstances mentioned

below. A fourth was obtained by A. E. Strover, a scholar of Plumtree School, in March, 1954. Still more recently I have seen another ♀ taken at Selukwe by A. H. R. Stevenson.

Enemies. The tailless, much-chewed remains of a large *lineata* were present in the stomach of a topotypic Mozambique Genet (*Genetta tigrina mossambica*) that was basking, shortly after sun-up, high in a big baobab where I shot it.

Localities. Mozambique: Angoche; *Kasumbadedza near Tete; Matlale (type). *Southern Rhodesia:* *Plumtree; *Selukwe.

Range. Mozambique, west through Southern Rhodesia.

PROSYMNA GREIGERTI Mocquard

- 1906c. *Prosymna Greigerti* Mocquard, Bull. Mus. Hist. Nat. (Paris), 12, p. 466: Lobi region, French Sudan, i.e. French West Africa.
 1916g. Chabanaud, p. 438.
 1919a. Boulenger, p. 285.
 1929a. Werner, p. 142.
 1933f. Angel, p. 125, figs. 47-47a.
 1950b. Villiers, p. 87, fig. 112.

Description. Rostral with angular horizontal edge, separated by a pair of internasals from the paired prefrontals; frontal large; loreal longer than high; preocular 1; postocular 1; temporals 1 + 2; upper labials 5, the second and third entering the orbit; lower labials 2, the first 3 in contact with the single pair of sublinguals. Midbody scales smooth, in 15 rows; ventrals 168; anal entire; subcaudals 18.

Color. Above, chestnut brown, duller on the neck; on temporal region, sides of neck, and rest of body, each scale has a white central spot. Below, lips and throat dusky, otherwise whitish, uniform.

Size. Length of holotype, presumably a ♀ (Paris Mus.), 173 (159.5 + 13.5) mm.

Remarks. Since Lt. Greigert collected the type almost fifty years ago, no second example has been taken. The type locality is near the northwest frontier of the Gold Coast and the northeast Ivory Coast. In view of Chabanaud's recording of an aberrant

melcagris with paired internasals at Dagana, Senegal, the possibility that *greigerti* (whose paired internasals and paired prefrontals chiefly separate it from *melcagris laurenti*) is also an aberrant, should be borne in mind.

PROSYMNA SOMALICA Parker

1930b. *Prosymna somalica* Parker, Ann. Mag. Nat. Hist., (10) 6, p. 605: Haud, 8° N., 47°22' E., at 2,000 feet, British Somaliland.

1932b. Parker, p. 364.

1949a. Parker, p. 64.

Common Name. Northern Somaliland Shovel-snout (A.L.).

Description. Rostral with angular horizontal edge; separated by a pair of internasals from the single, very rarely divided (B.M.1949.2.1.91 only) prefrontal; frontal large; loreal longer than high; preocular 1, rarely 2 (B.M.1949.2.1.94); postocular 1; temporals 1 + 2; upper labials 6, the third and fourth entering the orbit; lower labials 8, the first three in contact with the sublinguals. Midbody scale-rows 15, smooth; ventrals 114-144 (♂♂ 114-126; ♀♀ 132-144); anal entire; subcaudals 23-38 (♀♀ 23-29; ♂♂ 30-38).

Color. Above, dark purplish brown, the free edge of each scale margined with lighter. Below, white, usually uniform, the throat sometimes invaded by the darker dorsal coloring.

Size. Length of holotype ♂ (B.M.1930.5.9.12) 193 (154 + 39) mm.; length of ♀ (Parker: 1932b) 119 (104 + 15) mm.

Remarks. Only a single pair of sublinguals are well developed; the three following scales do not differ appreciably from the corresponding scales in other species of *Prosymna*, though in the holotype of *somalica* they were actually longer than the anterior pair. While assuming this most northerly representative of the genus is ancestral to its neighbor *a. ruspolii* to the south, with which it has much in common, I agree with Parker as to its specific distinctness.

Dentition. Parker (1949a) invites attention to the less specialized development of the posterior maxillary teeth which, in a 250 mm. *somalica*, measure only 1.0 mm. as against 1.6 mm. in an *ambigua stuhlmanni* of similar size.

Habitat. In addition to the type, taken at 2000 feet, Colonel R. H. R. Taylor secured a dozen other examples at altitudes ranging from 3500 to 4500 feet, in stone-strewn sandy terrain whose scant vegetation consisted largely of acacia-euphorbia bush interspersed with patches of grass.

Localities. **British Somaliland:** Bohodle; Borama District; Burao; Haud (many positions being designated by latitude and longitude).

Range. British Somaliland.

PROSYMNA MELEAGRIS LAURENTI subsp. nov.

1843. *Calamaria meleagris* Reinhardt (part: ♀ only; omit ♂), K. Danske Vidensk. Selsk. Afhandl., 10, p. 238, pl. i, figs. 4-6: "Guinea," as old museum specimen, possibly near Gambia?
1849. *Prosymna meleagris* Gray (part¹³⁷), p. 80.
1862. Jan, p. 55 (? Sierra Leone).
- 1894a. Boulenger, p. 249.
- 1908a. Sternfeld, pp. 409, 425.
- 1909b. Sternfeld, p. 17.
- 1915d. Boulenger, p. 649.
- 1916g. Chabanaud, p. 440 (French Congo and Sudan only).
- 1919a. Boulenger, p. 285.
1922. Aylmer, p. 15 (but possibly not this race).
- 1922a. Angel, p. 39.
- 1929a. Werner, p. 142, fig. 40.
- 1933f. Angel, p. 126, fig. 48.
1937. Andersson, p. 8.
1938. Angel & Lhote, p. 366.
- 1950a. Villiers, p. 70.
- 1950b. Villiers, p. 87, fig. 113.
1951. Monard, p. 151.
- 1954b. Laurent, p. 57.
- 1956c. Loveridge, 1955, p. 45.
- 1884a. *Temnorhynchus sundervallii* Rochebrune (not Smith), p. 149.
- 1884a. *Temnorhynchus meleagris* Rochebrune (not Reinhardt), p. 150.
- 1884a. *Temnorhynchus frontalis* Rochebrune (not Peters), p. 150.
- 1884a. *Temnorhynchus ambiguus* Rochebrune (not Boeage), p. 151 (all four of these Rochebrune references are ignored).
- 1918b. *Prosymna meleagris collaris* Chabanaud (not Sternfeld), p. 164.
- 1933m. *Prosymna ambigua* Witte (part: not Boeage), p. 91 (Kunungu).

¹³⁷ Inevitably many of the following citations are in part only, though preponderately the new form. See also citations under *meleagris*.

Common Name. Sudanese Shovel-snout (A.L.).

Holotype. Museum of Comparative Zoology No. 53383, an adult ♂ from Mongalla, Equatoria Province, Sudan, collected by John Owen, Esq., between May and August, 1950.

Paratypes. Twenty ♂♂ and ten ♀♀ from Equatoria, viz. Museum of Comparative Zoology Nos. 53377-53392 (less 53383), from five localities (Lokwi; Magwe; Mongalla; Okaru; Torit); also Chicago Natural History Museum Nos. 48070-2, 58402-4, 58406-8, 58443, 62233-6, 62238-9, from three localities (Katire; Molongori; Torit), all collected by John Owen.

Diagnosis. *Calamaria meleagris* was described by Reinhardt on the basis of two specimens (a third, subsequently seen, receives passing mention in a postscript), obviously a ♂ and ♀, though this is not stated. Both were from "Guinea," a name that in 1843 was applied to any of the countries bordering the Gulf of Guinea from Portuguese Guinea to the French Congo. Fortunately Reinhardt states that his two snakes had different origins. One formed part of a collection sent to Copenhagen Museum in 1836 by Herr Chenon, assistant to the "government establishment on the coast." Presumably he refers to Christiansborg, one-time seat of Danish administration on the coast of Ghana near Accra, for the various species of snakes donated by Chenon are still common in Ghana. The smaller ♂, the main basis of Reinhardt's description, agrees in every way with Ghana *m. meleagris* as here defined.

Reinhardt's second snake (presumably the larger ♀) was said to have come from the collection of the "old natural history society." As its scale-counts fall within the range of the Sudanese race it may have come from the general region of Gambia, alternatively, though less likely at that early date, from the interior of Nigeria or Cameroon. Owing to the description of *meleagris* being based on both races, the separation of the forms has been obscured until now. Indeed it was not until I was able to assemble adequate series from Ghana (22 specimens) and the Sudan (31 examples) that the respective ranges in ventral and subcaudal counts could be demonstrated.

Race	No. & Sex	Ventrals	Caudals	Largest example
<i>m. melcagris</i>	15 Ghana ♂ ♂ have	137-150;	31-36;	257 (220 + 37) mm.
<i>m. laurenti</i>	21 Sudan ♂ ♂ have	151-160;	33-36;	280 (238 + 42) mm.
<i>m. melcagris</i>	8 Ghana ♀ ♀ have	155-166;	19-23;	270 (255 + 24) mm.
<i>m. laurenti</i>	10 Sudan ♀ ♀ have	170-184;	21-25;	360 (332 + 28) mm.

Description of holotype. ♂. Midbody scale-rows 15; ventrals 158; subcaudals 36; preocular 1; postocular 1; temporals 1 + 2.

Description. Rostral with angular horizontal edge; separated by the single, rarely divided,¹³⁸ bandlike internasal from the single prefrontal; frontal large; loreal longer than high, rarely divided¹³⁸; preocular 1; postocular 1¹³⁹; temporals 1 + 1 or 1 + 2, rarely 1 + 3 or 2 + 2¹⁴⁰; upper labials 5, rarely 6, the second and third, rarely the third and fourth,¹⁴¹ entering the orbit; lower labials 7-8, the first 3 in contact with the single pair of sublinguals. Midbody scales smooth, in 15 rows; ventrals 151-184¹⁴² (♂ ♂ 151-160; ♀ ♀ 170-184); anal entire; subcaudals 21-36¹⁴³ (♀ ♀ 21-25; ♂ ♂ 33-36).

Color. Above, head black or brown, except for rostral and labials which may be white; body pale brown (juvenile) to black (adult), each scale with a whitish terminal spot. Below, white to yellowish white, the dorsal pigmentation usually impinging on either side of the ventrals in the region of the neck; occasionally chin and throat brown,¹⁴⁴ otherwise uniform.

Chabanaud (1918b) refers to *collaris* a Dagana snake that he describes as being: Above, a rather deep rosy brown; head uniform except for a pair of large white spots on the parietals posteriorly; on either side of the neck the white underside extends

¹³⁸ Divided, yet in contact by their anterior angles while separated posteriorly by an azygous, triangular shield whose base rests on the center of the bandlike prefrontal, only in a Dagana snake recorded by Chabanaud (1918b).

¹³⁹ Two in a Kunungu ♀ (R.G.M.C. 5676) *vide* Laurent (1945b).

¹⁴⁰ 2 + 2 in only one (C.N.H.M. 58403) of 22 Torit snakes.

¹⁴¹ Six, the third and fourth entering the orbit only on side of a Mongalla ♀ (M.C.Z. 53384).

¹⁴² 151 in a Torit ♂ (M.C.Z. 53388); 184 in a Torit ♀ (C.N.H.M. 48070).

¹⁴³ 19 in a McCarthy Id. snake (*vide* Andersson:1937); 21 in several Torit ♀ ♀; 25 in a Lokwi ♀ (M.C.Z. 53378), and, but not checked, 26 in a Poli specimen (Vienna Mus.).

¹⁴⁴ Brown only in a Torit ♂ (C.N.H.M. 62234).

upwards to form a collar that almost meets in a point on the median line of the nape; on the rest of the back each scale bears a whitish terminal spot. Below, throat brown in advance of the collar, otherwise under surface white, uniform.

Assuming this *Prosymna* from Dagana is referable to the Sudanese form — as would appear from the ventral counts of two Gambia snakes furnished by Andersson — *collaris* appears to be only a color phase occurring erratically within the ranges of either race of *melcagris*. There remains a possibility that snakes from the extreme west may represent yet another race of *melcagris*, something that can be demonstrated only by assembling all the known material from the region.

From Poli, in northwest Cameroon, we have a gravid ♀ with heavy black collar which looks rather different from the extensive Sudanese series. In this it would seem to resemble the Yola (Jola) snake mentioned by Sternfeld (1908a) from northeast Nigeria, both localities being near Garoua. Ventral counts of three other Poli snakes in Vienna Museum (but unsexed) indicate they are referable to the Sudanese race, though slightly intermediate as might be expected.

Size. Length of type, the largest ♂ (M.C.Z. 53383) 280 (238 + 42) mm., from Mongalla; largest ♀ (C.N.H.M. 48070) 360 (332 + 28) mm., from Torit.

Dentition. Maxillary teeth 6, the anterior 4 minute, the last 2 large; an arrangement strikingly different from that of *angolensis* *vide* Laurent (1954b).

Sexual dimorphism. In addition to the marked difference in the number of ventrals and subcaudals (as may be seen by reference to the *Description*) the tail is distinctly longer in ♂ ♂, as may be seen from the following figures:

In 13 Sudan ♂ ♂, tail is included in H. & B. length 5.6 to 6.3 times; in 9 Sudan ♀ ♀, tail is included in H. & B. length 10.0 to 11.9 times.

Habitat. Most of the Sudan series were hoed up during cultivation, but two of them were found beneath rubbish in Owen's garden.

Localities. **Sudan:** *Katire; *Lokwi; *Magwe; *Molongori; *Okaru; *Torit. **Belgian Congo:** Kunungu. **French Congo:** (as *melcagris*; *vide* Chabanaud). **British Cameroon:** *Poli near

Garoua. **Nigeria:** *Yola (Jola). **Sierra Leone:** (*vide* Jan:1862). **Portuguese Guinea:** Mansoa. **Gambia:** McCarthy Island. **Senegal:** Dagana. **French West Africa:** Dano near Diebougon, Upper Volta; French Sudan; Kati, 12 km. north of Bamakko, Beldogou; San; Thies.

Range. Southern Sudan westward through northern Belgian Congo, northern Cameroon, northern Nigeria, to Senegal, i.e. from about 3° S. of the equator in Central Africa to almost 20° N. on the west coast.

PROSYMNA MELEAGRIS MELEAGRIS (Reinhardt)

1843. *Calamaria meleagris* Reinhardt (part: ♂ only; omit ♀), K. Danske Vidensk. Selsk. Afhandl., 10, p. 238, pl. i, figs. 4-6: "Guinea," as Chenon coll., probably Ghana.
1849. *Prosymna meleagris* Gray (part¹⁴⁵), p. 80.
1862. Jan, p. 55.
1885. Müller, p. 678.
- 1894a. Boulenger, p. 249.
- 1896d. Boulenger, p. 641.
- 1901b. Werner, p. 638.
1903. Gough, p. 466.
1910. Lönnberg, p. 6.
- 1915d. Boulenger, p. 649.
- 1916f. Chabanaud, p. 372 (Dahomey and Ivory Coast only).
- 1916g. Chabanaud, p. 440.
- 1917b. Chabanaud, p. 11.
- 1917a. Phisalix, p. 333.
- 1919a. Boulenger, p. 285.
1922. Aylmer, p. 15 (but possibly not this race).
1929. Flower, p. 218.
- 1929a. Werner, p. 142, fig. 40.
- 1933f. Angel, p. 216, fig. 48.
1945. Leeson, p. 1.
1950. Leeson, pp. ix, 64-66, 134, fig. 30.
- 1875a. *Temnorrhynchus meleagris* Peters, p. 198.
- 1908b. *Prosymna meleagris* var. *collaris* Sternfeld, Mitt. Zool. Mus. Berlin, 4, pp. 216, 231: Misahöhe, Togo, Ghana (restricted).
- 1909a. Sternfeld, p. 16, fig. 24.
- 1916g. Chabanaud, p. 440.

¹⁴⁵ Inevitably most of the following citations are also in part only; for others, see citations under the new subspecies.

Further citations of "*meleagris*," including *meleagris concolor* Lönnberg, will be found under *a. ambigua*.

Common Names. Ghana Shovel-snout (A.L.); Reinhardt's Ground-Snake (Flower).

Description. Rostral with angular horizontal edge; separated by the single bandlike internasal from the single prefrontal; frontal large; loreal longer than high; preocular 1; postocular 1; temporals 1 + 2; upper labials 5, rarely 6, the second and third, rarely the third and fourth¹⁴⁶ entering the orbit; lower labials 7-8, the first 3 in contact with the single pair of sublinguals. Midbody scales smooth, in 15 rows; ventrals 137-166¹⁴⁷ (♂ ♂ 137-150; ♀ ♀ 155-166); anal entire; subcaudals 19-36¹⁴⁸ (♀ ♀ 19-23; ♂ ♂ 31-36).

Color. Typical. Above, head black or brown, except for rostral and labials which may be white; body pale brown (juvenile) to black (adult), each scale with a whitish terminal spot. Below, white to yellowish white, the dorsal pigmentation usually impinging on either side of the ventrals in the region of the neck; occasionally chin and throat brown, otherwise uniform.

Var. *collaris*. Said by Sternfeld to exhibit two longitudinal, posteriorly converging, white marks in the parietal region, while the dark portion of the nape is bordered posteriorly by a white nuchal collar. This coloration, says Sternfeld, is exhibited by several Togo snakes of various ages whose lepidosis in no way differs from those of other specimens. This kind of coloration is present in our smallest *m. meleagris* ♀ (M.C.Z. 55231) from Pong-Tamale, Northern Territory, Ghana, which measures 124 (114 + 10) mm. However, the first pair of white blotches are situated on the temporal region and barely impinge on the parietals; two scale-rows behind the parietals there is a larger pair of white spots on the nape, closely followed by a broad black bar narrowly edged posteriorly with white. There is no trace of such markings in a juvenile ♂ (M.C.Z. 53697) from near Achimota, Ghana, yet only 1 mm. longer in body length

¹⁴⁶ Six, the third and fourth entering orbit on one side only of a Niger snake (Gough:1903).

¹⁴⁷ 137 in ♂♂ from Somanya (M.C.Z. 55229) and Lagos (C.N.H.M. 41119); 166 in ♀♀ from Achimota (M.C.Z. 53693 and C.N.H.M. —).

¹⁴⁸ 19 in an Achimota ♀ (C.N.H.M. —); 36 in ♂♂ from Achimota and Lagos (C.N.H.M. 41119).

than the ♀. It is doubtful if any significance attaches to this variant as it has been recorded from as far away as Dagana, Senegal (see *Remarks* under the Sudanese subspecies).

Size. Largest ♂ (M.C.Z. 53698) 257 (220 + 37) mm., from Achimota; largest ♀ (M.C.Z. 55224) 279 (255 + 24) mm., from Somanya.

Anatomy. No parotids present (Phisalix).

Sexual dimorphism. In addition to the marked difference in the number of ventrals and subcaudals, as may be seen by reference to the *Description*, the tail is distinctly longer in ♂♂. Thus:

In 12 Ghana ♂♂, tail is included in H. & B. length 5.4 to 6.6 times.

In 8 Ghana ♀♀, tail is included in H. & B. length 10.3 to 11.6 times.

Habitat. A Lagos and several of the Achimota snakes were found in roadside gutters intended for carrying off rain water. Most Somanya snakes were dug up by labourers.

Localities. **Nigeria:** Lagos; Niger. **Dahomey:** Agouagou. **Togo:** Adele (as Bismarekburg); Mangu; Misahöhe; Wegbe. **Ghana:** Accra; *Achimota; *Odumase; *Pong-Tamale, Northern Territories; *Somanya, Krobo. Also "Guinea" (type locality; probably Christianborg). Possibly the records from **Ivory Coast** (*vide* Chabanaud) and **Sierra Leone** (*vide* Jan) belong here, but no scale counts are available.

Range. Southern Nigeria west to Ghana, and probably Ivory Coast possibly even as far as Sierra Leone.

PROSYMNA FRONTALIS (Peters)

- 1867b. *Temnorhynchus frontalis* Peters (part). Monatsb. Akad. Wiss. Berlin, p. 236, pl —, figs. 1-1d: Otjimbingue, Southwest Africa.
 1894a. *Prosymna frontalis* Boulenger, p. 248.
 1898. Sclater, p. 99.
 1910b. Boulenger, p. 508.
 1910. Lönnberg, p. 5.
 1910b. Sternfeld, p. 20, fig. 21.
 1910c. Sternfeld, p. 55.
 1912. FitzSimons, F. W., p. 88.
 1916g. Chabanaud, p. 439.

- 1929a. Werner, p. 142.
 1955a. Mertens, p. 94.
 1902. *Prosymna (Pseudoprosymna) bergeri* Lindholm, in Lampe, Jahrb. Nassau. Ver. Naturk. (Wiesbaden), 55, p. 57: Rietmond, Gibeon District, Southwest Africa.
 1910b. Boulenger, p. 509.
 1910b. Sternfeld, p. 20, fig. 21.
 1912. FitzSimons, F. W., p. 88.
 1914b. Methuen & Hewitt, p. 143.
 1915c. Werner, p. 360.
 1916g. Chabanaud, p. 439.
 1929a. Werner, p. 142.
 1938. FitzSimons, V. F., p. 156.

Further citations of "*frontalis*" will be found under *s. bivittata*, *lineata* and *m. laurenti*.

Common Name. Southwest African Shovel-snout (A.L.).

Description. Rostral with angular horizontal edge; separated by the single bandlike internasal from the single prefrontal; frontal large; loreal as long as high; preocular 1; postoculars 2, rarely 1¹⁴⁹; temporals 1 + 2; upper labials 6-7, the third and fourth entering the orbit; lower labials 8-9, the first 3, rarely 4, in contact with the single pair of sublinguals. Midbody scales smooth, in 15 rows; ventrals 160¹⁵⁰-188 (♂♂ 160¹⁵⁰-169; ♀♀ 180-188); anal entire; subcaudals 34-51 (♀♀ 34-38; ♂♂ 48-51).

Color. Above, head light gray finely dusted with black, a more or less distinct dark crossband along the posterior margin of the prefrontal, or between the eyes, and a dark crescentic blotch on the parietals which may be reduced to an interparietal streak or spot; except for a black subocular spot, sides of head and neck whitish; a broad black nuchal band followed by several similar crossbands that become progressively fainter and ill-defined posteriorly; body and tail gray to pale yellowish brown on the sides, each scale edged with pale purplish brown or blackish, their centers often whitish and forming wavy whitish crossbands. Below, white, yellowish white, or brown, uniform.

Size. Length of a ♂ (T.M. 17597) 187 (153 + 34) mm.; the *bergeri* cotype ♂ (Wies.Mus.) 160 (131 + 29) mm.; the *bergeri*

¹⁴⁹ On one side only of the holotype.

¹⁵⁰ 150 for a Usakos ♂ (*vide* Werner:1915c) requires verifying.

cotype ♀ (Wies.Mus.) 155 (135 + 20) mm.; the *frontalis* holotype ♂ (Berlin Mus.) 300 (244 + 56) mm.¹⁵¹; largest ♀ (S.M.F. 46739) 355 (312 + 43) mm., from Kaiser-Wilhelms-berg.

Remarks. The ventrals and subcaudals of the type have been recounted by Dr. H. Wermuth and found to be 162 (not 167) and 48 (not 50) respectively; actually 48 conforms to Peters' illustration.

The name *frontalis* had fallen into disuse for 25 years until revived by Mertens (1955) whose detailed reasons for synonymizing *bergeri* should be consulted. Actually, though by a different route, I had arrived at the same conclusion in 1950 when the following paragraph was written, though unpublished until now.

P. bergeri was based on two snakes in which the posteriorly directed nasal suture was incomplete; such was also the case with a Klipfontein snake taken by FitzSimons (1938). In all other respects — both of lepidosis and color pattern — they conform so closely to *frontalis* that one can only conclude the character is a variable one or that Peters' figure is incorrect in this detail.

Localities. **Little Namaqualand:** Klipfontein. **Southwest Africa:** Churutabis; Gobabis; Kaiser-Wilhelms-berg near Okahandja; Narudas Sud at 4800 feet; Okahandja; Otjimbingue; Rietmond; Usakos.

Range. Little Namaqualand north to Southwest Africa.

PROSYMNA ANGOLENSIS Boulenger

- 1873b. *Prosymna frontalis* Bocage (not Peters), p. 218.
 1882a. Bocage (part:omit Angoche = *lineata*), p. 288.
 1895a. Bocage, p. 98, pl. xi, fig. 2.
 1896d. Boulenger, p. 641.
 1915a. *Prosymna angolensis* Boulenger, Proc. Zool. Soc. London, p. 209: based on Bocage, 1895a, which see for description. No type locality so Huila, 15°5'S., 13°30'E., Angola is now designated.
 1916g. Chabanaud, p. 439.
 1929a. Werner, p. 142.
 1937b. Monard, pp. 114, 122.

¹⁵¹ As remeasured by Dr. Wermuth, Peters' figures were obviously erroneous, they read: "Totalänge 0m135; Schwanz 0m057."

1955a. Mertens, p. 94.

1937b. *Prosymna ambigua* Mertens (not Bocage), p. 13 (Cubal).

1938e. *Prosymna ambigua ambigua* Mertens (not Bocage), p. 439.

For another citation of "*angolensis*" see under *a. ambigua*.

Common Names. Southwest Angola Shovel-snout (A.L.); *golongo* (in Caconda: Bocage).

Description. Rostral with angular horizontal edge; separated by the single bandlike internasal from the single prefrontal; frontal large; loreal rhomboidal or pentagonal; preocular 1; postocular 1-2; temporals 1 + 2; upper labials 6, the third and fourth entering the orbit; the first 3 lower labials in contact with the single pair of sublinguals. Midbody scales smooth, in 15 rows; ventrals "145-163" (*vide* Bocage: probably ♂♂ 145-155; ♀♀ 155-163); anal entire; subcaudals "17-25" (*vide* Bocage: probably ♀♀ 16-19; ♂♂ 25-28).

Color. Above, head yellowish brown, with or without black spots of which the most common is a black band across the frontal anteriorly, followed by a pair of black blotches on the supraoculars and parietals; a black nuchal spot or collar more or less distinguishable on the paler yellowish-brown specimens, followed on the back by two longitudinal series of round, black or blackish, spots; sometimes uniform, or each scale with a light spot near its tip and the edges of the scales somewhat darker. Below, including the lips and two or three outermost scale-rows, yellowish white.

Size. Largest recorded, presumably a ♀ (Bocage:1873b), 360 (331 + 29) mm.; next largest ♀ (Mertens:1938e), 327 (305 + 22) mm. from Cubal.

Remarks. No type for *angolensis* was designated by Boulenger, whose basis was "*frontalis* Bocage (1895: not of Peters)" in Herp. Angola Congo, p. 98, pl. xi, fig. 2. Bocage lists his material as coming from seven localities in the high plateau of Benguella and Mossamedes. Mertens (1955, p. 94) errs in giving Duque de Braganca, northwest Angola, as type locality for *angolensis*, for this was type locality of *ambigua* Bocage (cf. p. 100).

Mertens (1955) suggests the possibility of *angolensis* being a race of *frontalis* from which it is chiefly distinguished by its much lower ventral and subcaudal counts — so much lower, in fact, that the gap is unlikely to be bridged. More probably its relationship lies with *lineata* Peters of Mozambique, with which it is connected by Southern Rhodesian material.

Localities. Southwest Africa: Karakuwisa, Okavango. **Angola:** Biballa; Caconda; Cubal; Ebanga; Huila; Maconge (Maconja); Mossamedes; Quibula; Quindumbo; Quissange.

Range. Southwest Africa north to southwest Angola.

PROSYMNA AMBIGUA AMBIGUA Bocage

- 1866a. *Prosymna melcagris* Bocage (not Reinhardt), p. 47.
 1873b. *Prosymna ambigua* Bocage, Journ. Sci., Lisboa, 4, p. 218: Duque de Braganca, Angola.
 1895a. *Prosymna ambigua* Bocage, p. 99, pl. xi, figs. 1a-d.
 1896d. Boulenger, p. 641.
 1910. Lönnberg, p. 6.
 1915a. Boulenger, p. 208.
 1915c. Boulenger, p. 625.
 1929a. Werner, p. 142.
 1931. Monard, p. 104.
 1937b. Monard (part), pp. 114, 123.
 1910. *Prosymna melcagris concolor* Lönnberg, Arkiv. Zool., 7, No. 8, p. 5, fig. 2: Mukinbungu, Lower Congo River, Belgian Congo.
 1916g. Chabanaud, p. 440.
 1940. *Prosymna angolensis* Bogert (part: not Boulenger), p. 59 (Cape-longo).
 1941a. *Prosymna ambigua ambigua* Uthmüller (part), p. 43.
 1950f. Laurent, p. 129.
 1953a. Laurent, pp. 21, 23.
 1953. Witte, p. 206, fig. 65.
 1954b. Laurent, p. 52.
 1956. Laurent, p. 193.
 1952b. *Prosymna ambigua bocagei* Laurent (part: not Boulenger), p. 200 (for ♀ with 154 ventrals, substitute Leopoldville for "Nepoko, Uele").
 1953a. *Prosymna ambigua loveridgei* Laurent, p. 23 (no description: "un seule specimen, du Mayombe").
 1954b. Laurent, Serv. Cult. Comp. Diam. Angola. Museu Dundo, No. 23, p. 56, fig. 15: Boma, Lower Congo River, Mayombe, Belgian Congo.

Of the foregoing citations several are actually "in part"; further listings of "*ambigua*" will be found under *m. laurenti*, *angolensis*, *a. bocagii*, *a. urundiensis*, *a. brevis* and *a. stuhlmanni*.

Common Name. Northwest Angola Shovel-snout (A.L.).

Description. Rostral with angular horizontal edge¹⁵²; separated by the single bandlike internasal from the single prefrontal; frontal large; loreal longer than high; preocular 1; postoculars 2, rarely 1¹⁵³; temporals 1 + 1, 1 + 2 or 2 + 2¹⁵⁴; upper labials 5-8,¹⁵⁵ rarely the second and third, or second, third and fourth, normally the third and fourth, entering the orbit; lower labials 7-8, the first 3 in contact with the single pair of sublinguals. Midbody scales smooth, in 15-17¹⁵⁶ rows; ventrals¹⁵⁷ 129-154 (♂♂ 129-140; ♀♀ 145-154); anal entire; subcaudals 19-34 (♀♀ 19-24; ♂♂ 26-34).

Color. Above, rostral and upper lip white; each parietal with or without a whitish spot; a broad black nuchal collar sometimes present; otherwise head and body gray, pale brown or black, the apex of each scale with or without a whitish spot. Below, yellowish white to blackish gray, uniform, or the center of each ventral with a more or less distinct dusky mark, the edges of each scute paler.

Size. Largest ♂ (R.G.M.G. —), 283 (237 + 46) mm.; largest ♀ (R.G.M.G. —), 345 (313 + 32) mm., both from Bokoro (ex. Laurent:1954b). The type of *ambigua*, evidently a ♀, was given as 225 (113 + 12) mm. The type of *loveridgei*, also a ♀, was given as 313 (281 + 32) mm.

Remarks. In the synonymizing of *m. concolor* from the Lower Congo with *a. ambigua* from northwest Angola, Laurent (1954b) and I are in complete accord. It seems somewhat illogical, how-

¹⁵²The rostral is fused with the internasal in some Bokoro snakes; in others the internasal is fused with the prefrontal (Laurent:1954b).

¹⁵³One on left side only of Kamina and Mushishi ♂♂ (Laurent:1954b).

¹⁵⁴2 + 2 on one side of a Hemptinne St. Benoit ♂; in another specimen the second lower temporal is fused with the fifth upper labial (Laurent:1954b).

¹⁵⁵From 5-8 in Laurent's material; 5, the second and third entering the orbit in the type of *concolor* as well as in one of Laurent's specimens.

¹⁵⁶17 in the types of *ambigua* and *concolor*; both 15 and 17 present from Bokoro; Kunungu and Leopoldville examined by Laurent (1954b).

¹⁵⁷131-140 in Laurent's ♂♂, but 129 for a Vila da Ponte snake (*vide* Monard:1931) which requires checking; also the color description given by Monard suggests the possibility that he had an *angolensis* as a second specimen.

ever, to then postulate the presence of two races in the Lower Congo by describing *a. loveridgei* from there. *P. a. loveridgei*, as Laurent points out, differs from all other Congo *Prosymna* seen by him in that the horizontal suture, that normally extends backwards from the nostril to the loreal, is, in *loveridgei*, connected by a vertical fissure to the first labial. This has resulted in the splitting off of a small supplementary nasal.

On the left side of one (I 3598) of the 50 Liwale *a. stuhlmanni* I examined, there is no horizontal suture whatever, the nostril being in an entire nasal. As long ago as 1923 Schmidt recorded the creation of a supplementary loreal by vertical fissuring of the loreal in one of his Garamba *a. bocagii*. Since then other instances of fissuring have been reported among members of this genus so that it seems reasonable to assume that the only known example of *a. loveridgei* is nothing more than an aberrant *a. ambigua*.

Apart from its small supplementary shield, the only way in which *a. loveridgei* ♀ differs from ♀ ♀ of *a. ambigua* is in having 24 (as against 19-21) subcaudals. Other more adequately represented species and races of *Prosymna* display an even wider range than the 6 which would result from extending the range from 19 to 24 so as to include *a. loveridgei*. It would appear that I am destined to outlive my namesake which, regretfully, I must consign to the synonymy.

Dentition. Maxillary teeth 8, followed by 3 enlarged, lancet-shaped teeth, according to Bogert (1940: dealing with a Capelongo ♀), who points out that "the anterior part of the maxilla makes a diagonal suture with a posterior elongation of the premaxilla," apparently an unusual adaptation calculated to provide mechanical support for the snout during burrowing operations.

Laurent (1954b), dealing with Congo material, reports the maxillary teeth as 8, the first six small, the last 2 enlarged. In this he sees a difference with "*angolensis*," to which species Bogert had referred the Capelongo snake which I believe to be an *a. ambigua*.

Sexual dimorphism. In addition to the marked difference in the number of ventrals and subcaudals, as may be seen in the *Description*, 15 ♂♂ (measured by Laurent) have tails included in H. & B. 4.6 to 5.8¹⁵⁸ times; 13 ♀♀ (9 + 1 measured by Laurent) have tails included in H. & B. 8.6 to 10.7 times.

Localities. **Angola:** Capelongo (Bogert:1940); Duque de Braganca (type of *ambigua*); *Missao di Dondi (M.C.Z. 32468); Vila da Ponte.¹⁵⁸ **Belgian Congo:** Albertville; Bokoro; Boma (type of *loveridgei*); Bukena; Congo da Lemba; Hemptinne St. Benoit, Kasai; Kalina; Kamina; Kilwezi; Kisantu; Kunungu; Leopoldville; Lomami; Mabwe; Mayombe; Mukimbungu (type of *concolor*); Mushishi; Ndwa; Thysville; Tipoyo, Fijji Territory; Upper Katanga. **French Congo:** *Brazzaville.

Range. Northwest Angola, north through Belgian Congo to French Congo.

PROSYMNA AMBIGUA BOCAGII Boulenger

- 1897b. *Prosymna bocagii* Boulenger, Ann. Mag. Nat. Hist., (6) 19. p. 278, figs. —: Zongo, Ubangi Rapids, Belgian Congo.
 1901g. Boulenger, p. 9, pl. iii, fig. 4.
 1903b. Boeage, p. 63.
 1906c. Mocquard, p. 467 (but omit *Fassci* as syn.).
 1910. Lönnberg, p. 6.
 1915a. Boulenger, p. 208.
 1916g. Chabanaud, p. 440.
 1929a. Werner, p. 142.
 1937c. Loveridge, p. 275.
 1908. *Aparallactus concolor* Werner (not Fischer), (1907), p. 1882 (text).
 1916f. *Prosymna ambigua* Chabanaud (not Boeage), p. 372.
 1916g. Chabanaud, p. 439.
 1919g. Boulenger, p. 25 (*Prosymma*).
 1923. Schmidt, p. 89, figs. 7-8 (but “♀” is a ♂).

¹⁵⁸ 6.5 times in one of Monard's (1931) Vila da Ponte snakes, if his measurements (195 + 30) mm. are correct. The assignment of his two specimens to *ambigua* should be checked for the scale counts (ventrals 129; subcaudals 26), though not the locality, agree with *a. brevis*. The coloration, however, seems to be that of *angolensis*. It might be translated as follows: Above, gray; prefrontal with a black, V-shaped marking extending to above the eyes as in *frontalis*, from the frontal across the parietals to the post-parietal scales extends a large nuchal blotch; body reticulated with black, on the dorsum a double row of black, sometimes confluent, spots tend to be more symmetrical posteriorly (Monard:1931). The low number of ventrals rule out the possibility of these Vila da Ponte snakes being referred to either *angolensis* or *frontalis*.

- 1933m. Witte (part), p. 91.
 1936. *Prosymna ambigua stuhlmanni* Pitman (part: not Pfeffer), p. 126, pl. viii, figs. 1-2; col. pl. H, fig. 2 (Uganda records).
 1938a. Pitman (part) p. 310.
 1938b. Pitman (part), pp. 39, 120-121, 149, 310, pls. as above.
 1952b. *Prosymna ambigua bocagei* Laurent, p. 200.
 1954b. Laurent, p. 54.
 1956. Laurent, p. 193.
 1956c. *Prosymna ambigua ambigua* Loveridge (not Bocage), p. 45 (9 in reprint).

Common Name. Northeast Congo Shovel-snout (A.L.).

Description. Rostral with angular horizontal edge; separated by the single band-like internasal from the single prefrontal, which occasionally may enter the orbit¹⁵⁹; frontal large; loreal as long as,¹⁶⁰ or longer than, high; preocular 1, rarely absent¹⁶¹; postoculars 1, 2 or 3¹⁶²; temporals 1 + 1, 1 + 2 or 2 + 2¹⁶³; upper labials 5-7, rarely the second and third,¹⁶⁴ normally the third and fourth, entering the orbit; lower labials 7-8, the first 3, rarely 4, in contact with the single pair of sublinguals. Midbody scales smooth, in 15 rows; ventrals 139-168 (δ δ 139-148; φ φ 161-168); anal entire; subcaudals 17-32 (φ φ 17-21; δ δ 27-32).

Color. Above dark brown, head uniform, body seemingly paler owing to the center of each scale being lighter (blue gray), imparting a reticulate appearance which extends to the outermost rows. Below, blackish brown, each ventral and subcaudal shield with a median, transverse, light bar.

Size. Largest δ (A.M.N.H. 12145) 298 (250 + 48) mm., from Garamba; largest φ (R.G. 3381) 398 (366 + 32) mm., from Niangara; the holotype φ (R.G. 44) was 347 (320 + 27) mm. as remeasured by Laurent (1954b).

Remarks. See comments under *P. a. urundiensis* Laurent.

¹⁵⁹ On one side of *bocage* type and in a Batangabo φ (A.N.S.P. 20763).

¹⁶⁰ A small supplementary loreal is split off from nasal in a Garamba δ (not φ : A.M.N.H. 12144).

¹⁶¹ In the Lado snake mentioned by Werner (1908), if referable to *bocagei*.

¹⁶² Three in a Nopoko River δ reported by Laurent (1954b).

¹⁶³ Both 1 + 1 and 1 + 2 occur in the Sudan and Uganda; 2 + 2 in an Avakubi δ (Laurent: 1954b).

¹⁶⁴ Asymmetrically in a Congo snake (Laurent: 1954b).

Hemipenis. Schmidt (1923), when figuring the extraordinary unforked hemipenis of this species with its single sulcus, remarks that the organ is at least 10 mm. longer than the tail and in consequence must be "telescoped" when withdrawn. He suggests that the tail reduction responsible for this unusual condition has resulted from the adoption of burrowing habits.

Sexual dimorphism. In addition to the marked difference in the number of ventrals and subcaudals, as may be seen in the *Description*, in 8 known ♂♂, tail is included in H. & B. length 5.1 to 6.8 times; in 7 known ♀♀, tail is included in H. & B. length 11.0 to 12.8 times.

Breeding. On July 2, at Molongori, a ♀ held 6 eggs measuring about 16 to 23 x 7 mm.

Localities. **Sudan**: *Molongori; *Torit. **Uganda**: *Eastern Province; Lado = West Nile Province; Serere, Teso. **Belgian Congo**:¹⁶⁵ Avakubi; Garamba; Karawi, Ubangi; Mahagi Port; Nepoko, Uele; Niangara; Upper Ubangi; Zongo, Ubangi Rapids (type). **French Congo**: ? Batangafo.

Range. Southern Sudan and Uganda, west through northern Belgian Congo to French Equatorial Africa.

PROSYMNA AMBIGUA URUNDIENSIS Laurent

1933j. *Prosymna ambigua* Witte (not Bocage), p. 123.

1953a. *Prosymna ambigua urundiensis* Laurent, p. 23 (no description: "un seul specimen de Nyanza").

1954b. Laurent, Serv. Cult. Comp. Diam. Angola. Museu Dundo, No. 23, p. 56: Nyanza on Lake Tanganyika, Belgian Ruanda-Urundi.

1956. Laurent, p. 193.

Common Name. Urundi Shovel-snout (A.L.).

Description (adapted from Laurent). Preocular 1; postoculars 2; temporals 1 + 2; upper labials 6, the third and fourth entering the orbit; lower labials 8-9, the first 3 in contact with the single pair of sublinguals. Midbody scales smooth, in 15 rows; ventrals 152 (in ♂); anal entire; subcaudals 32 (in ♂).

Size. Length of holotype ♂ (R.G.M.C. 9232) 235 (199 + 36) mm.

¹⁶⁵ Omitted are a ♂ and ♀ (I.R.S.N. 4885) allegedly from Mpese-Inkisi, Lower Congo, listed in a footnote by Laurent (1954b) who regards data as doubtful.

Remarks. That the sexing is correct seems certain from the 32 subcaudals, the same number as present in a *P. a. bocagii* ♂ (C.N.H.M. 58405) from as far north as Torit in the Sudan. The only grounds for the separation of *urundiensis*, therefore, rest on its possession of 152 ventrals (139-148 in ♂♂ *bocagii*). A range of 10 in ♂ ventrals is also found in *a. ambigua*, *a. brevis*, *frontalis* and *m. laurenti*, but is exceeded in half a dozen other *Prosymna*. If the range of *a. bocagii* is extended to include *urundiensis* it would give a range of 14 ventrals as opposed to an acceptable range of 16 in ♂♂ of the much better known *a. stuhlmanni*. Further collecting of *Prosymna* in Urundi should indicate which is the correct course to follow.

PROSYMNA AMBIGUA BREVIS Laurent

1950f. *Prosymna ambigua ambigua* Laurent (not Bocage), p. 129.

1953. Witte (part), p. 206 (Sandoa).

1954b. *Prosymna ambigua brevis*, Laurent, Serv. Cult. Comp. Diam. Angola, Museu Dundo, No. 23, p. 50, figs. 12-14: Dundo, Angola.

Common Name. Northeast Angola Shovel-Snout (A.L.).

Description (after Laurent). Preocular 1; postoculars 1-2; temporals 1 + 2, fused in one specimen, the second temporal fused with the fifth upper labial in another; an additional upper labial is asymmetrically present in two snakes; lower labials 8-9, the first 3 or 4 in contact with the single pair of sublinguals. Midbody scales smooth, in 15 rows; ventrals 127-146 (♂♂ 127-136; ♀♀ 140-146); anal entire; subcaudals 15-30 (♀♀ 15-17; ♂♂ 25-30).

Color. For comments on its variability, see Laurent (1954b).

Size. Length of ♂ (R.G.M.C. 7929) 308 (267 + 41) mm.; length of ♀ (R.G.M.C. 8276) 351 (325 + 26) mm., both from Sandoa.

Remarks. In ventral counts this form overlaps those of *a. stuhlmanni*, but is apparently distinguishable by the low number of subcaudals in the ♀. In ♂♂, however, the subcaudal ranges overlap so that a specimen of *a. stuhlmanni* from Abercorn (M.C.Z. 54081) with 139 ventrals and 29 subcaudals might be referred to *a. brevis* were it not for the accompanying ♀ (M.C.Z. 54082) having 155 ventrals and 20 subcaudals. For further comments on the status of this form, see Laurent (1954b).

Sexual dimorphism. The relationship of tail to total length is given by Laurent (1954b) as ranging from .075 to .087 in ♀ ♀, and from .146 to .150 in ♂ ♂.

Localities. **Angola:** Dundo; Sombo. **Belgian Congo:** Sandoa, Katanga.

Range. Northeast Angola, north to southeast Belgian Congo.

PROSYMNA AMBIGUA RUSPOLII (Boulenger)

- 1896b. *Athenophis ruspolii* Boulenger, Ann. Mus. Civ. Stor. Nat. Genova, (2) 17, p. 12; Magala, Umberto Id., Ganale Doria, Somalia.
 1897g. Boulenger, p. 279.
 1915d. Boulenger, p. 649.
 1927. Calabresi, p. 54.
 1929a. Werner, p. 143.
 1930e. Scorteccei, p. 18.
 1949a. Parker, p. 65.
 1929c. *Prosymna agrestis* Scorteccei, Atti Soc. Ital. Sci. Nat. (Milano), 68, p. 272, figs. —: Villaggio Duca degli Abruzzi, Somalia.
 1939a. Scorteccei, p. 273.
 1949a. Parker, p. 63.

Common Name. Southern Somaliland Shovel-snout.

Description. Rostral with angular horizontal edge; separated by the single bandlike internasal from the single prefrontal; frontal large; loreal longer than high; preocular 1; postocular 1; temporals 1 + 2; upper labials 6, the third and fourth entering the orbit; lower labials 8, the first 3 in contact with the single pair of sublinguals. Midbody scales smooth, in 15 rows; ventrals 130-154 (♂ ♂ 130-136; ♀ ♀ 143-154); anal entire; subcaudals 23-27 (♀ ♀ 23-?; ♂ ♂ 32-37).

Color. Above, dark reddish to purplish brown; usually a light spot on the apex of each scale, whose free edge may appear lighter. Below, yellowish gray, somewhat darker anteriorly.

Size.

Length of ♂ (type of *ruspolii*) 198 (165 + 33) mm.,

length of ♀ (type of *agrestis*) 252 (226 + 26) mm., length of largest assumed ♀ (Scorteccei: 1929a) 295 (262 + 33) mm.

Remarks. As pointed out by Parker (1949a, p. 63), there is nothing to distinguish *agrestis* from *ruspolii* except the alleged

differences in dentition, and he suggests that the enlarged posterior maxillary teeth have been overlooked in the juvenile type of *Asthenophis*, and the second example of *ruspolii*, which Scorteccei called a ♀, is almost certainly a ♂. Parker rightly urges a re-examination of the dentition of these two specimens, but, as my attempt to borrow one of the cotypes met with no response, I venture to risk censure by synonymizing *agrestis* with *ruspolii*.

Breeding. One 295 mm. ♀ from Belet Amin held 4 eggs, each measuring "275 [presumably 27.5] x 7 mm." (Scorteccei:1939a).

Localities. Somalia: Belet Amin; Jonderma; Magala; Villaggio Duca degli Abruzzi.

Range. Somalia.

PROSYMNA AMBIGUA ORNATISSIMA Barbour & Loveridge

1928e. *Prosymna ornatissima* Barbour & Loveridge, Mem. Mus. Comp. Zool., 50, p. 120, col. pl. ii, fig. 2; Nyange, Uluguru Mountains, Tanganyika Territory.

1928j. Loveridge, p. 75.

1937f. Loveridge, p. 502.

1941a. Uthmüller, p. 40.

Common Name. Ornate Shovel-snout (A.L.).

Description. Rostral with angular horizontal edge; separated by the single bandlike internasal from the single prefrontal; frontal large; loreal longer than high; preocular 1; postoculars 0-1-2; temporals 1 + 2 (the anterior one entering the orbit below the postocular on the right side of M.C.Z. 23270 only); upper labials 6, the third and fourth entering the orbit; lower labials 7-8, the first 3 in contact with the single pair of sublinguals; midbody scales smooth, in 15 rows; ventrals 127-150 (♂♂ 127-132; ♀ 150); anal entire; subcaudals 27-40 (♀ 27; ♂♂ 35-40).

Color. Above, rostral and rest of head scarlet (whitish in alcohol) except for a black crossband over the prefrontal-frontal suture (frequently reduced to a vertical streak from eye to labials), and an arrow-shaped extension of the black body coloring reaching to the frontal; body black with 13 or 14 irregularly transverse, scarlet crossbars which may be interrupted on the vertebral line or broken and alternating. Below, throat pink; rest of undersurface black except where the lateral scarlet blotches impinge on the outer edges of the ventrals.

No other member of the genus is so handsomely and aposematically colored (*vide* plate).

Size. Length of paratype ♂ (M.C.Z. 23272) 297 (242 + 55) mm.; length of holotype ♀ (M.C.Z. 23271) 286 (252 + 34) mm.

Breeding. On October 4, the umbilical ventral scutes of a young 143 (117 + 26) mm. male were still unhealed.

Habitat. A forest-edge species occurring from 2000 to 2500 feet. For further details see original description.

Localities. **Tanganyika Territory:** Uluguru Mountains—Nyange; Vituri.

Range. Tanganyika Territory.

PROSYMNA AMBIGUA STUHLMANNI (Pfeffer)

- 1891a. *Prosymna ambigua* Boulenger (not Bocage), p. 306.
 1894a. Boulenger, p. 248.
 1896a. Bocage, p. 93.
 1896. Tornier, p. 71 (reprinted 1897).
 1897. Tornier, p. 65.
 1902b. Boulenger, p. 17.
 1907a. Boulenger, p. 11.
 1908b. Boulenger, p. 229.
 1910b. Boulenger (part), p. 509 (omit Angola).
 1910a. Sternfeld, p. 21, fig. 23.
 1912. FitzSimons, F. W., p. 88.
 1923e. Loveridge, p. 880.
 1924b. Loveridge, p. 5.
 1928c. Barbour & Loveridge, p. 121.
 1933h. Loveridge, p. 244.
 1934. Pitman, p. 295.
 1893. *Ligonirostra Stuhlmanni* Pfeffer, Jahrb. Hamburg Wiss. Anst., 10, p. 78, pl. i, figs. 8-10: Usambara, Tanganyika Territory.
 1906b. *Prosymna Vassei* Mocquard, Bull. Mus. Hist. Nat. (Paris), 12, p. 250: Mozambique.
 1906c. Mocquard, p. 467.
 1916g. Chabanaud, pp. 433, 440, figs. 1-2.
 1917e. Chabanaud, p. 225, fig. — (correcting previous drawing).
 1909c. *Prosymna variabilis* Werner, Jahres. Ver. Nat. Württemberg, 65, p. 57: Moshi, Tanganyika Territory.
 1910a. Sternfeld, p. 21.
 1915c. Boulenger, p. 626.
 1916g. Chabanaud, p. 438.

- 1924b. Loveridge, p. 6.
 1929a. Werner, p. 142.
 1909c. *Stenorhabdium temporale* Werner, Jahres. Ver. Nat. Württemberg, **65**, p. 60: "East Africa."
 1929a. Werner, p. 164.
 1915c. *Prosymna bocagii* Boulenger (part: not Boulenger:1897b), p. 625.
 1924b. Loveridge, p. 5.
 1936j. *Prosymna ambigua stuhlmanni* Loveridge, p. 254.
 1936. Pitman (part), p. 126, pl. viii, figs. 1-2; col. pl. H, fig. 2 (omit Uganda records).
 1937f. Loveridge, pp. 493, 496.
 1938a. Pitman (part), p. 310.
 1938b. Pitman (part), pp. 39, 120-121, 149, 310, pls. as above (reprint: omit Uganda records).
 1939. Someren, p. 155.
 1941. Moreau & Pakenham, p. 108.
 1941a. Uthmüller, pp. 26, 43.
 1941b. Uthmüller, p. 235.
 1942e. Loveridge, p. 281.
 1950. Ionides, p. 101.
 1951. Battersby, p. 829.
 1951a. Loveridge, p. 192.
 1953e. Loveridge, p. 265.
 1955e. Loveridge, p. 184.
 1937. *Prosymna ambigua bocagii* Uthmüller (not Boulenger:1897b), p. 110.

Common Name. East African Shovel-snout (A.L.).

Description. Rostral with angular horizontal edge; separated by the single bandlike internasal from the single, rarely divided,¹⁶⁶ prefrontal; prefrontal very rarely entering orbit¹⁶⁷; frontal large; loreal as long as, or longer than, high; preocular 1, rarely absent¹⁶⁸; postoculars 2, rarely 1¹⁶⁹ or absent¹⁷⁰; temporals

¹⁶⁶ Divided in a juvenile ♀ (U.M.M.Z. 61221) found bottled at Morogoro, but without locality (Loveridge: 1932c).

¹⁶⁷ Entering in type of *vassci*, also in occasional specimens at M.C.Z.

¹⁶⁸ Absent on one side only of an Ngatana ♂ (M.C.Z. 40562), and a Lumbo ♂ (M.C.Z. 18203).

¹⁶⁹ One on 9 sides only of 80 snakes examined.

¹⁷⁰ Absent through fusion with supraocular on right side of a Liwale ♀ (M.C.Z. 51311).

rarely 1 + 1,¹⁷¹ usually 1 + 2, occasionally 1 + 3¹⁷² or 2 + 2¹⁷³; upper labials 5-7, rarely the second and third or second, third and fourth, normally the third and fourth, entering the orbit¹⁷⁴; lower labials 7-8, the first 3, rarely 4, in contact with the single pair of sublinguals. Midbody scales smooth, in 15 rows; ventrals 129-155 (♂♂ 129-144; ♀♀ 144-155); anal entire; subcaudals 19-34 (♀♀ 19-28; ♂♂ 29-34).

Color. Above, rostral and upper lip yellowish white, otherwise head and body gray (young), each scale edged with darker, or plumbeous (adult), uniform or with two dorsolateral rows of white flecks. Below, usually white, uniform or with irregular dusky markings which may form a median line along the tail, rarely brown or black.¹⁷⁵

Battersby (1951), after examining 38 East African *a. stuhlmanni* (together with 2 Uganda snakes which I refer to *a. ambigua*), found that 26 had a more or less distinguishable dorsolateral series of white specks on either flank, but no trace of such markings in the more southwesterly material extending into Northern Rhodesia. He decided this speckling was uncorrelated with age, sex or scale-counts. The seeming geographical difference I believe to be fortuitous.

Size. Length of ♂ (M.C.Z. 40562) 238 (200 + 38) mm., from Ngatana, largest ♀ (M.C.Z. 54082) 323 (293 + 30) mm. from Abercorn, surpassing even a ♀ (B.M. 1902.2.12.91) of 280 (250 + 30) mm., from Mazoe. It would appear that there is an increase in size in the Rhodesias as one approaches the range of the somewhat larger typical race.

Remarks. Mocquard (1906c) erroneously synonymized his *vassci* with *bocagii*. Chabanaud (1916g) corrected Mocquard's miscounts of ventrals and subcaudals, but himself published a

¹⁷¹ 1 + 1 through fusion of the lower temporal with fifth upper labial on left side of fa Mapenya ♀ (M.C.Z. 40560).

¹⁷² 1 + 3 on 3 sides of 2 Liwale ♀♀ (M.C.Z. 51395, 51397).

¹⁷³ 2 + 2 on right side of an Abercorn ♂ (M.C.Z. 54081).

¹⁷⁴ In the respective ratios of 2-2-74.

¹⁷⁵ In one (M.C.Z. 51390) of 18 Liwale snakes, and two (M.C.Z. 54081-2) Abercorn specimens (♂♀).

figure in which only two labials (later amended) entered the orbit. In 1918 I collected (M.C.Z. 18203) a normal *stuhmanni* from within three miles of the type locality of *vassei*.

After examining the ♀ cotype of *variabilis* Werner, I (1933h) synonymized it with *stuhmanni* as the character on which it was based is a juvenile one.

If the holotype of *Stenorhabdium temporale*, whose shrivelled condition rendered Werner's examination of it "distinctly difficult," was indeed procured in "Ostafrika" by student Schwarzkopf, there can be little doubt it was based on an aberrant ♂ *a. stuhmanni*. I have never seen a specimen in which the parietal was in contact with the labial, which might be brought about by fusion of the temporals with labials, but I have recorded fusion of the lower temporal with the fifth labial in a Ngatana snake, also a "Morogoro" reptile in which the internasal was divided. In Werner's type both internasal and prefrontal were allegedly divided; possibly this appearance may have resulted from the shrivelled condition of which Werner complains. In other respects his holotype, now lost I believe, conforms to a male *a. stuhmanni* in its lepidosis and scale counts.

Breeding.

On May 28, at Mapenya nr. Witu, a ♀ held 3 eggs measuring 20 x 6 mm.

On November 23, at Liwale, T.T. a ♀ held 3 eggs measuring 30 x 7 mm.

Others on January 5 and February 23 from this locality also held large eggs.

Diet. Young geckos (*Hemidactylus mercatorius*, possibly *mabouia*) were present in the stomachs of a Liwale and a Mtimbuka snake.

Habitat. Uthmöller (1937) has taken this species from a grass-grown heap of stones in a coffee plantation. I caught two that had been ploughed up by a tractor working in a sisal plantation; others were found beneath the rotting roots of a fallen tree; beneath a rotting log; under a bundle of rotting grass on the mud veranda of a hut; and in a termitarium. They occur from the coastal plain to upland savanna at 5500 feet in the Chyulu Hills.

Localities. **Kenya Colony:** Chyulu Hills; *Mapenya; *Mkonumbi; Mombasa; *Ngatana. **Tanganyika Territory:** *Amboni Estate near Tanga; *Bagamoyo; Bukoba¹⁷⁶; Dar es Salaam; Gomberi; *Kilwa; Litumba; *Liwale; Malimba; Masasi; “? Morogoro”; Moshi; *Mpwapwa; Mto-wa-Mbu; *Tunduru; Usambara (type of *stuhmanni*). **Zanzibar. Mozambique:** *Kasumbadedza; *Lumbo; Mozambique. **Nyasaland:** *Mtimbuka; Shire Valley. **Northern Rhodesia:** *Abercorn; Mbala Region, East Loangwa District. **Southern Rhodesia:** *Imbezi, Mtali; Mazoe; Salisbury. **Transvaal** (eastern): Hectorspruit; Letaba. **Zululand:** Gwalileni; *Hluhlwe; Ingwavuma; Kosi Bay; Ubombo.

Range. Coastal region of Kenya Colony, south to Zululand, Natal, northwest through the Rhodesias to ? Bukoba,¹⁷⁶ Tanganyika Territory.

PROSYMNA AMBIGUA TRANSVAALENSIS Hewitt

- 1910b. *Prosymna transvaalensis* Hewitt, Ann. Transvaal Mus., 2, p. 73: Tzaneen, Zoutpansberg District, Transvaal.
 1916g. Chabanaud, p. 440 (key).
 1929a. Werner, p. 142 (key).

Description. Preocular 1, rarely 2 (T.M. 5200 only); postocular 1 rarely 2 (T.M. 5200 only), but in the type the single preocular is fused with the supraocular on the right side; temporals 1 + 2 or 2 + 3 (not 1 + 3) on one side (of T.M. 5200); upper labials 5-6, the second and third or second, third and fourth, entering the orbit (both conditions present in T.M. 5202) except in one paratype (T.M. 5200) where they are separated from the eye by suboculars; lower labials 7-9, the first 3, rarely 4 (on one side of T.M. 5201), in contact with the single pair of sublinguals which, with their following scales in no way differ from those of *a. stuhmanni*. Midbody scales smooth, in 15 rows; ventrals 155-158; anal entire; subcaudals 22-25 (not 26).

Color. Above, black, with two interrupted dorsolateral flecks, none on the tail. Below, white.

Size. Length of type ♀ (T.M. 10120) 260 (235 + 25) mm.

Sexual dimorphism. In the two adults, of which the type has been sexed by Dr. FitzSimons and corollary evidence suggests the

¹⁷⁶ West of Lake Victoria so possibly referable to *P. a. ambigua*.

other also is a ♀, the tail is contained in the head and body length from 7.5 to 9.4 times.

Remarks. I am indebted to Dr. V. F. FitzSimons, Director of the Transvaal Museum, for all the preceding information not included in the original scanty description. From the above it will be seen that, excepting for some aberrations (given in italics) in one of the young paratypes (T.M. 5200) from Medingen, this alleged race differs only from *a. stuhlmanni* in its slightly higher ventral counts of 155-158 (144-155 in *stuhlmanni* ♀♀). Both ventrals and subcaudals suggest that all four specimens are ♀♀.

I consider they represent a small pocket of individuals for Tzaneen is on the railway just south of the Beit Bridge across the Limpopo from Southern Rhodesia where *P. a. stuhlmanni* occurs. Medingen lies slightly east of Tzaneen; only a little farther east again *a. stuhlmanni* has been obtained at Letaba and ranges south to Zululand.

There are no westerly records until we come to *P. a. ambigua*. It is on this account that I have allowed the name to stand for the present, though it appears possible it will eventually have to be synonymized with *a. stuhlmanni* and the range of ventrals of that form extended upward to 158.

Localities. **Transvaal:** Medingen, Klein Letaba River (3 paratypes); Tzaneen (type).

Range. Northern Transvaal.

PROSYMNA JANI BIANCONI

1862. *Prosymna Janii* Bianconi, Mem. Accad. Sci. Ist. Bologna, (2) 1. p. 470, pl. i (*Janii* on plate): Inhambane, Mozambique.
 1862? Bianconi, p. 386, pl. xv (reprint of above).
 1862. Jan, 2, p. 56.
 1876. Jan, pl. ii, fig. 1.
 1882a. Peters, p. 106.
 1884a. Rochebrune, p. 151 (ignored).
 1894a. Boulenger, p. 249 (*jani*; so spelled by most subsequent authors).
 1896a. Bocage, p. 100.
 1908b. Boulenger, p. 229.
 1910b. Boulenger, p. 509.

1910. Lönnberg, p. 5.
1912. FitzSimons, F. W., p. 88.
1916g. Chabanaud, p. 438.
1929a. Werner, p. 142.

Common Name. Keel-sealed Shovel-snout (A.L.).

Description. Rostral with angular horizontal edge; separated by the single bandlike internasal from the single prefrontal; frontal large; loreal longer than high; preocular 1; postoculars 2-3; temporals 1 + 2; upper labials 6-7, the third and fourth entering the orbit; lower labials 8, the first four in contact with the sublinguals. Midbody scale-rows 15-17 (15 in Kosi Bay snake, said to be 17 in Inhambane type) keeled; ventrals 113-119; anal entire; subcaudals 30-37.

Color. Above, head yellowish, a black crossbar on the prefrontal extends backwards over frontal to unite with a black area covering parietals and nape, except for a light cordiform patch on nape; body pale reddish brown with a double series of conspicuous black spots along the anterior two-thirds of the back. Below, yellowish-white, uniform.

Size. Length of holotype (ex Bianconi) 180 (148 + 32) mm., from Inhambane; length of another (Brit. Mus.) 224 (188 + 36) mm., from Kosi Bay. Both likely to be males.

Remarks. Nothing in the bibliography adds anything to the original descriptions of Bianconi and Jan, which are frequently in disagreement. Ventrals are given as 117 and 119 for the holotype, subcaudals as 32 and 37. When Peters (1882a) gave the latter as 34 he was perhaps trying to strike an average. Though both give the scale-rows as 17, Jan adds that they are reduced to 15 posteriorly. There are certainly only 15 in the Kosi Bay snake which I have examined, and I suspect that the count of 17 was made in advance of midbody. Only these two examples of this handsome little species are known.

Localities. **Mozambique:** Inhambane. **Natal:** Kosi Bay, Zululand.

Range. Southeast coast of Mozambique (23°S.) to northeast corner of Natal (28°).

PROSYMNA PITMANI Battersby

1951. *Prosymna pitmani* Battersby, Ann. Mag. Nat. Hist., (12) 4, p. 828:
Kilwa, Southern Province, Tanganyika Territory.
- 1955e. Loveridge, p. 184.
- 1957a. Loveridge p. 11.

Common Name. Multi-scaled Shovel-snout (A.L.).

Description. Rostral with angular horizontal edge; separated by the single bandlike internasal from the single prefrontal; prefrontal narrowly excluded from orbit; frontal large; loreal usually wedge-shaped, longer than high; preoculars 1-2; postoculars 2; temporals 1 + 2 or 2 + 2; upper labials 6, the third and fourth entering the orbit; lower labials 8, the first 3 in contact with the single pair of sublinguals. Midbody scales smooth, in 19-21¹⁷⁷ rows; ventrals 140-157 (140-151¹⁷⁸ in ♂♂; 155-157 in ♀♀); anal entire: subcaudals 17-27 (17-20 in ♀♀; 25-27 in ♂♂).

Color. Above, rostral and upper lip more or less yellowish white, the labials blotched with darker; otherwise head, body and tail purplish black (dark gray when about to slough), each scale, except the outermost on either side, with a whitish terminal spot. Below, including the lower part of each lateral scale, white, uniform.

Size. Length of holotype ♂ (B.M. 50.1.3.96) 309 (275 + 34) mm., from Kilwa; length of ♀ (M.C.Z. 54527) 308 (285 + 23) mm., from Liwale.

Remarks. *Prosymna pitmani*, distinguished from all other members of the genus by its 19-21 midbody scale-rows, appears to be ancestral to *P. a. stuhlmanni*.

Hemipenis. Battersby comments on the extremely large size of the retractor muscles which, lying in many convolutions, extend from the hemipenis to almost the tip of the tail. In the paratype, evagination of the right hemipenis had resulted in the convolutions being straightened out and the muscles so extended that they are almost threadlike. Similar conditions were noted in *P. ambigua stuhlmanni*, *P. somalica* and *P. melcagris*, but not in ♂♂ of *P. s. sundevallii* whose retractor muscles were quite straight.

¹⁷⁷ 19 in 5 ♂♂ and 1 verified ♀ : 21 in the remaining 5 ♀♀ in M.C.Z.

¹⁷⁸ 151 in holotype ♂ *fdc* Battersby.

Breeding. On June 6, at Liwale, a ♀ held 4 eggs measuring 8 x 20 or 23 mm.

Diet. The stomach of the aforementioned ♀, as also of the largest ♀ taken in May, each held two or more, 30 mm. long, collapsed shells of hatched-out snake or lizard eggs! This is our sole information of the diet of this species so recently discovered by C. J. P. Ionides.

Localities. Tanganyika Territory: Kilwa; Liwale; Mavuji River (upper reaches in western part of Kilwa District); Nanguale (type locality in Kilwa District, Mr. Ionides informs me).

Range. Southeastern Tanganyika Territory.

Genus CHILORHINOPHIS Werner

1907. *Chilorhinophis* Werner, Akad. Anz., Wien, **44**, p. 479 (brief notice), and 1908 (for 1907), Sitzb. Akad. Wiss. Wien, **116**, p. 1881 (59 in reprint). Type by original designation: *C. butleri* Werner.
1927. *Parkcrophis* Barbour & Amaral, Bull. Antivenin Inst. America, **1**, p. 25. Type by original designation: *Apostolepis gerardi* Boulenger.
- 1927b. Parker, Ann. Mag. Nat. Hist., (9) **20**, p. 84.

Definition. Maxillary very short, with 3-4 teeth followed after an interspace by a pair of large grooved fangs situated below the anterior border of the eye, posterior end of maxilla horseshoe-shaped; a maxillary-ectopterygoid foramen; ectopterygoid simple; palatine and sometimes pterygoid teeth present; mandibular teeth slightly enlarged posteriorly. Head small, not distinct from neck; snout rounded, not prominent; eye small, with round or vertically subelliptic pupil; nasal entire, separate from or fused with first labial; no internasals; no loreal; preocular present or absent; usually no anterior temporal.

Body cylindrical, elongate; scales smooth, without apical pits, in 15 rows; ventrals rounded; anal divided. Tail short, obtuse; subcaudals paired. Hemipenis of male with sulcus spermaticus unforked. Hypapophyses absent posteriorly in the vertebral column.

Range. Central and eastern Africa, viz. Sudan, south through eastern Belgian Congo to Southern Rhodesia, northeast through Mozambique to southern Tanganyika Territory.

Remarks. Boulenger (1913b, p. 104) expressed the opinion that nothing in the dentition or scalation of *gerardi* justified its separation from the South American genus *Apostolepis*.

Barbour and Amaral (1927, p. 25), without African material and overlooking Werner's description, stated that the African snakes should be separated as *Parkerophis*, characterized by (1) a smaller head, (2) smaller gape, (3) 4 instead of 6 labials, (4) the complete separation of nasal from preocular by the prefrontal forming a suture with the second labial. As a similar arrangement to that described for this last character is exhibited by specimens of the Brazilian *A. assimilis* and *A. dorbignyi* (both represented in the collection of the Museum of Comparative Zoology at that time), the argument is invalid. The first two differences are merely relative, being based on the smaller size of the African species, so that little is left but their third character—a poor one indeed for the erection of a genus.

However, Parker (1927b, p. 84), discovering the similarity of the ectopterygoid foramen of *Parkerophis* to that of related species, while differing structurally from the foramen occurring in *Apostolepis* and its neotropical allies, concluded that the external similarities between the genera were convergencies rather than the result of phylogeny. He therefore supported the separation proposed by Barbour and Amaral, though on more substantial grounds.

Battersby (1950, p. 415) reviewed the genus and, unjustifiably I think, synonymized *carpenteri* with *butleri*.

Key to the Species

1. Nasal shield distinct from first labial; prefrontal separated from orbit by preocular; frontal about $1\frac{1}{2}$ times as long as broad 2
- Nasal shield fused with first labial to form a single nasolabial shield¹⁷⁹; prefrontal either entering orbit or separated from it by preocular; frontal only slightly longer than broad 3
2. Ventrals in ♂♂ 308-310, in ♀ 375; subcaudals in ♂♂ 25-26, in ♀ 23; tail included 17.8-18.6 times in total length of ♂♂, 23.6 times in ♀; maximum recorded length of ♂ 486 mm., of ♀ 569 mm.; range:

¹⁷⁹Not fused on right side of a ♀ (M.C.Z. 51328) from Liwale, the only one of about 50 paratypes to show such a reversion to the ancestral arrangement.

- western Tanganyika Territory (Ujiji) south to Northern Rhodesia (Nyamkolo), west to southern Belgian Congo (Lokonzolwa, Lake Mweru) *g. tanganyikae* (p. 170)
- Ventrals in ♂♂ 263-294, in ♀♀ 274-348; subcaudals in ♂♂ 27-31, in ♀♀ 20-26; tail included 12.3-15.2 times in total length of ♂♂, 16.2-21.2 times in ♀♀; maximum recorded length of ♂ 424 mm., of ♀ 513 mm.; range: southern Belgian Congo south to Southern Rhodesia *g. gerardi* (p. 172)
3. Ventrals in holotype ♂ 256; subcaudals 33; tail included 10.4 times in total length of ♂; length of only known ♂ 313 mm.¹⁸⁰; range: Sudan (Mongalla) *butleri* (p. 174)
- Ventrals in ♂♂ (unknown for *c. carpenteri*) 217-238, in ♀♀ 216-270 (or 288); tail included 10.5-12.9 times in *c. livalensis* ♂♂, 14.4-19.6 in ♀♀ (both races); maximum recorded length of *c. livalensis* ♂♂ 300 mm., of ♀♀ 335 mm. 4
4. Three longitudinal dark stripes along back and sides; range: south eastern Tanganyika Territory (3 or 4 localities) *c. livalensis* (p. 175)
- Five longitudinal dark stripes along back and sides; range: eastern Mozambique (Aneube, about 30 miles west of Porto Amelia) *c. carpenteri* (p. 177)

CHILORHINOPHIS GERARDI TANGANYIKAE Loveridge

- 1933h. *Chilorhinophis gerardi* Loveridge (part), p. 262.
1934. Pitman, p. 298.
- 1937f. Loveridge, p. 496.
1937. Pitman (part), p. 330 (Nyamkolo only).
- 1938b. Pitman (part), p. 183 (Nyamkolo only).
1947. Witte & Laurent (part), p. 54, figs. 43-45.
- 1951a. *Chilorhinophis gerardi tanganyikae* Loveridge, Bull. Mus. Comp. Zool., **106**, p. 195: Nyamkolo, Lake Tanganyika, Northern Rhodesia.
1953. Witte, p. 263.

Common Names. Western Tanganyika Two-headed Snake (English); *kasimwanamatenga* and *kalambanzila* (Kirungu).

Description. Rostral twice as broad as deep, the portion visible from above as long as one third of its distance from the frontal; nostril in a single nasal that is *not* fused with the first labial; prefrontals longer than broad, not entering the orbit; frontal longer

¹⁸⁰ Not 315 mm. says Dr. J. Eiselt, who kindly sexed the only known specimen and corrected a number of errors in the original description.

than its distance from the rostral, $1\frac{1}{3}$ - $1\frac{1}{2}$ times as long as broad, $1\frac{1}{4}$ -2 times as broad as a supraocular, its length included $1\frac{1}{2}$ - $1\frac{3}{4}$ times in that of a parietal; preocular 1, moderate; eye small, its diameter two-thirds its distance from the mouth; postocular 1, moderate; a moderate to large posterior temporal; upper labials 4, second in contact with a prefrontal, third entering the orbit, fourth largest and in contact with a parietal; lower labials 5, the first broadly in contact with its fellow behind the mental, 3 labials in contact with the anterior sublinguals, which are divergent and longer than the posterior.

Midbody scales smooth, in 15 rows; ventrals 308-375 (δ δ 308-310; ♀ 375); anal divided; subcaudals 23-26 (♀ 23; δ δ 25-26).

Color in alcohol. Above, head and neck black, the black descending on the sides of the neck suggesting a collar; labials yellow with black spots on rostral, beneath eye, and near gape; prefrontals, parietals and nape each bearing two small white spots; back yellowish white with a dark brown vertebral stripe flanked by a dark brown dorsolateral stripe on the fifth row and adjacent halves of the fourth and sixth scale-rows, the three stripes extending almost to tip of tail; the three lower lateral scale-rows uniform white; posterior third of tail black with lighter flecking. Below, throat and belly immaculate yellowish white, a black crossband on posterior third of tail, whose tip is also black. For color in life see Loveridge (1933h).

Size. Larger δ (M.C.Z. 48434) 486 (460 + 26) mm., tail being included in total length of δ δ 17.8-18.6 times; only known ♀ (I.G. 15.824) 569 (545 + 24) mm., its tail being included in total length 23.6 times. Midbody diameters in δ δ 4.5-5 mm., of ♀ about 3.5 mm.

Remarks. See Loveridge (1951a, p. 196).

Defense. When wriggling along, this snake applies its head to the ground while carrying its tail, which bears a striking resemblance to the head, upraised as if prepared to defend itself in a rearguard action. (Loveridge: see also Mertens, 1946b, pp. 31, 71).

Habitat. This slender species inhabits dry savanna both at Ujiji and Nyamkolo, where the type was found by men engaged in clearing weeds from the road leading to the London Missionary

Society's station on the bluff overlooking the bay. At the time the countryside was very dry, the rains having ceased a month previously.

Localities. **Tanganyika Territory:** Ujiji; also reported by natives as occurring at Kasanga. **Northern Rhodesia:** Nyamkolo. **Belgian Congo:** Lukonzolwa, Lake Mweru (Moeru).

Range. Tanganyika Territory (in the vicinity of Lake Tanganyika) and Northern Rhodesia, northwest to the Belgian Congo (in the vicinity of Lake Mweru).

CHILORHINOPHIS GERARDI GERARDI (Boulenger)

- 1913b. *Apostolepis Gerardi* Boulenger, *Revue Zool. Afr.*, **3**, p. 103, fig. —: Kikondja, Lualaba District, Belgian Congo.
 1915a. Boulenger, p. 214.
 1925. Werner (1924), p. 149.
 1928i. Witte, p. 9.
 1927. *Parkcrophis gerardi* Barbour & Amaral (part), p. 25.
 1927b. Parker, pp. 81, 82, 84, fig. 1.
 1933m. Witte, p. 95.
 1933h. *Chilorhinophis gerardi* Loveridge (part: citations only), p. 262.
 1937. Pitman (part), **4**, pp. 329, 330.
 1938b. Pitman, pp. 182, 183.
 1943a. Witte & Laurent, p. 157.
 1947g. Laurent, p. 39.
 1947. Witte & Laurent (part: omit some citations), p. 54, figs. 43-45.
 1950. Battersby, p. 417.
 1953. *Chilorhinophis gerardi gerardi* Witte, p. 261, fig. 90.
 1956. Laurent, p. 152.

Common Name. Congo Two-headed Snake (English).

Description. Rostral broader than deep, the portion visible from above as long as $\frac{1}{4}$ to $\frac{2}{5}$ its distance from the frontal; nostril in a single nasal that is *not* fused with the first labial; prefrontals longer than broad, not entering the orbit; frontal longer than its distance from the rostral, $1\frac{2}{5}$ to 2 times as long as broad, $1\frac{1}{4}$ to $1\frac{1}{5}$ times as broad as a supraocular, its length included $1\frac{1}{4}$ to $1\frac{1}{2}$ times in that of a parietal; preocular 1, moderate; eye small, its diameter equal to its distance from the mouth; postocular 1, moderate; a large (rarely 2) upper temporal bordering the parietal; upper labials 4, second in contact with a prefrontal, third (divided in one specimen) entering the

orbit, fourth largest and in contact with a parietal; lower labials 5, first broadly in contact with its fellow behind the mental, 3 labials in contact with the anterior sublinguals, which are divergent and longer than the posterior.

Midbody scales smooth, in 15 rows; ventrals 263-348 ($\delta \delta$ 263-294; $\text{♀} \text{♀}$ 274-348); anal divided; subcaudals 20-31 ($\text{♀} \text{♀}$ 20-26; $\delta \delta$ 27-31).

Color in alcohol. Above, head and neck black, the black descending on the sides of the neck suggesting a collar; labials speckled with yellow below and behind the eye; back yellowish with a black vertebral stripe and a dark dorsolateral stripe on the fifth and adjacent halves of the fourth and sixth scale-rows; posterior third of tail pale blue irregularly blotched with black. Below, throat immaculate white, belly and anterior portion of tail yellowish, the posterior third bluish flecked with black and white.

Size. Total length of type δ (R.G.M.C. 1205) 315 (290 + 25) mm.; largest δ (R.G.M.C. 11588) 424 (392 + 32) mm., tail being included in total length of $\delta \delta$ 12.3-15.2 times; largest ♀ (R.G.M.C. 748) 513 (486 + 27) mm., tail included in total length of $\text{♀} \text{♀}$ 17.2-22.2 times.

The measurements, and consequently proportions, of the largest δ furnished by Witte & Laurent (1943a, p. 158; 1947, p. 55) are amended in a letter from de Witte (25.xi.49).

Dentition. Maxillary, palatine and pterygoid teeth of a Sinoia snake have been figured by Parker (1927b).

Hemipenis. Not bifurcate; basal spines larger but relatively less numerous; it is possible to distinguish about 4 series of large spines intermingled with spines only half as big; in the more dilatable part of the organ there are about 40 spines arranged in 7 or 8 chevrons, being most minute and numerous towards the tip, which extends to the fifteenth caudal (Laurent:1956).

Localities. **Belgian Congo:** Elisabethville; Kankunda, Lupula River; Kaswabilenga, Lufiri River; Kikondja, Lualaba District; Kisantu, Lower Congo District; Lofoi, Upper Katanga District; Lukafu, Upper Katanga District; Lukulu, Tanganyika District; Mabwe, Lake Upemba; Mukabe-Kasari, Lualaba District; Tshilunda Village, Lualaba District. **Northern Rhodesia:**

(N.M.S.R.—C.I. 43.1.2.: Miss Wilson coll. 1923. Seen A.L.).
Southern Rhodesia: Lukosi; Sinoia Lomagundi District.

Range. Southern Belgian Congo, south to Southern Rhodesia.

CHILORHINOPHIS BUTLERI Werner

1907. *Chilorhinophis butleri* Werner, Akad. Anz. Wien, **44**, p. 479 (brief notice), and 1908 (for 1907), Sitzb. Akad. Wiss. Wien, **116**, p. 1881, pl. iii, figs. 8 a-d; Mongalla, Sudan.
 1910a?. Sternfeld, p. 33.
 1915d. Boulenger, p. 654.
 1924b. Loveridge, p. 7.
 1925. Werner (1924), p. 148.
 1937. Pitman, **4**, p. 329, pl. xii, fig. 1; col. pl. M, figs. 1-1b.
 1938b. Pitman, p. 181, pl. xii, fig. 1; col. pl. M, figs. 1-1b.
 1947. Witte & Laurent, p. 56, figs. 46-48.
 1950. Battersby (part), pp. 416, 417 (omit synonymy).

Common Names. Sudanese Two-headed Snake (English); Sudan Black-and-Yellow Burrowing Snake (Pitman).

Description. Rostral one and a third times as broad as deep,¹⁸¹ the portion visible from above about two-fifths¹⁸² its distance from the frontal; nostril in a single nasal that is fused with the first labial, so borders the mouth; prefrontals longer than broad, not entering the orbit; frontal shorter than the parietals; supraocular small; preocular 1; postocular 1 or absent; upper temporal large, bordering the parietal; upper labials 4 (if the nasolabial be considered the first), second in contact with a prefrontal, third entering the orbit, fourth largest and in contact with a parietal; lower labials 5, the first broadly in contact with its fellow behind the mental, 3 labials in contact with the anterior sublinguals, which are divergent and larger than the posterior pair.¹⁸³

Midbody scales smooth, in 15 rows: ventrals 256; anal divided; subcaudals 33 pairs.

¹⁸¹ Werner's statement to the contrary notwithstanding, for the rostral of the holotype has been measured with vernier callipers by Dr. J. Eiselt who (letter of 26.x.54) finds the breadth to be 1.1 mm., the depth .85 mm.

¹⁸² Eiselt's measurement for the portion of the rostral visible from above, is .5 mm., its distance from the frontal 1.25 mm.

¹⁸³ Werner's figure of the type, by Josef Fleischmann, is in error.

Color. Above, head and neck black, the latter descending on the sides of the neck suggesting a collar; labials yellow; occiput unspotted; back yellowish white with a black vertebral stripe; a black dorsolateral stripe on the fifth scale-row; a black bar across tail. Below, throat and belly immaculate yellowish; on tail the dorsal black cross bar is continued to form a complete ring on the middle third, a few black spots on tip.

Size. Total length of holotype ♂ (Vienna Mus.) 313 (283 + 30) mm.,¹⁸⁴ the tail being included in total length 10.4 times. Midbody diameter 4 mm.

Remarks. The type was brought in dead by natives on March 30, 1905, and named after A. E. Butler, the then Game Warden of the Sudan. Being still the only known specimen, the foregoing description is based on the original one, together with information gleaned from Fleischmann's drawing, besides corrections and amendments supplied me by Dr. J. Eiselt after a careful re-examination of the type. Fleischmann's misleading figures form the basis of all subsequent illustrations.

In assuming that Sternfeld's statement (1910a) "bis 32 cm." represented the measurement of an Amani snake, Pitman (1938b, p. 138) erred, for in round figures this was the length given by Werner for the holotype. Moreover, Sternfeld's description is also based on Werner's, and is not that of the Amani snake he referred to *butleri*. This specimen has been missing from the Berlin Museum since I first enquired for it 30 years ago. I suggest it may have been a misidentified *Aparallactus werneri*, a common Amani reptile with a color pattern not unlike that of *Chilorhinophis butleri*.

Habitat. Presumably arid upland savanna, possibly in the vicinity of the Nile.

Localities. **Sudan:** Mongalla.

Range. Sudan (*unknown* from Uganda and Tanganyika Territory).

CHILORHINOPHIS CARPENTERI LIWALENSIS Loveridge

1950. *Chilorhinophis carpenteri* Battersby (not Parker), p. 416.

1950. *Ionides*, p. 105.

¹⁸⁴ Sexed and carefully remeasured for me by Dr. J. Eiselt (14.ix.54).

1951a. *Chilorhinophis carpenteri liwalensis* Loveridge, Bull. Mus. Comp. Zool., **106**, p. 196: Liwale, Southern Province, Tanganyika Territory.

1955e. Loveridge, p. 188.

Common Names. Eastern Tanganyika Two-headed Snake (English); *kitandamba*, i.e. the one found among *ndandamba* beans (Ngindo, but not specific).

Description. Rostral nearly twice as broad as deep, the portion visible from above as long as about two times its distance from the frontal; nostril in a single nasal that is fused with the first labial, so borders the mouth; prefrontals longer than broad, entering or not entering the orbit; frontal shorter than its distance from the rostral, slightly longer than broad, about twice as broad as a supraocular, much shorter than a parietal; preocular 1, moderate, minute, or absent; eye small, its diameter about two-thirds its distance from the mouth; postocular 1; upper temporal large, bordering a parietal; upper labials 4 (if the nasolabial be considered the first), second in contact with a prefrontal, third entering the orbit, fourth largest and broadly in contact with a parietal; lower labials 5, the first broadly in contact with its fellow behind the mental, 3, rarely 4, labials in contact with the anterior sublinguals, which are divergent and longer than the posterior.

Midbody scales smooth, in 15 rows; ventrals 216-270 (♂♂ 217-238; ♀♀ 216-270¹⁸⁵); anal divided; subcaudals 18-30 (♀♀ 18-24; ♂♂ 25-30).

Color in alcohol. Above, head and neck black, the black descending on the sides of the neck suggesting a collar; labials yellow; temporal with or without a white spot; back yellowish white, a broad brown vertebral stripe on vertebral scale and adjacent halves; a dark dorsolateral stripe on adjacent halves of the fifth and sixth scale-rows, very rarely (M.C.Z. 50090 only) the lower lateral scales may be faintly edged with brown; posterior half of tail black, except for some blue-gray mottling about the tip. Below, chin with or without dusky markings, otherwise throat

¹⁸⁵ 288 (verified by A.L.) in a Kilwa ♀ (Brit. Mus.) with 18 subcaudals, unless this represents an undescribed subspecies. Its inclusion would give a ventral range of 73 for ♀♀ *c. liwalensis*, comparable to the 74 displayed by ♀♀ *g. gerardi*.

and belly immaculate yellowish white; proximal portion of tail white, separated by a black bar from a blue-gray area near the tip.

In life, according to Ionides, the basic color ranges from light yellow to khaki.

Size. Largest ♂ (M.C.Z. 51327) 300 (274 + 26) mm., tail being included in total length of ♂♂ 10.5-12.9 times; type ♀ (M.C.Z. 50076) 335 (315 + 20) mm., but surpassed by another ♀ (M.C.Z. 52832) of 360 (339 + 21) mm.,¹⁸⁶ tail being included in total length of ♀♀ 14.4-19.6 times. Midbody diameter of ♀ type, 3.5 mm.

Remarks. See Loveridge (1951a, p. 198).

Dentition. Pterygoid teeth on prepared skull, 3 or 4.

Diet. Worm-lizards (*Amphisbaena ionidesii*) were present in the stomachs of two Liwale snakes.

Habits. *Chilorhinophis*, like adult blind-snakes, usually remains underground except following heavy rain.

Localities. **Tanganyika Territory:** Southern Province: Kilwa¹⁸⁷; Liwale; Masasi District; Ruponda, Lindi District; Tunduru District.

Range. Southeastern Tanganyika Territory.

CHILORHINOPHIS CARPENTERI CARPENTERI (Parker)

1919. *Apostolepis gerardi* Carpenter (not Boulenger), p. 496.
 1925. Carpenter, p. 132, pl. vii.
 1927. *Parkerophis gerardi* Barbour & Amaral (part), p. 25.
 1927. *Parkerophis carpenteri* Parker, Ann. Mag. Nat. Hist., (9) 20, p. 85, fig. 3: "Anquabe," i.e. Ancuabe, Mozambique.
 1937. *Chilorhinophis carpenteri* Pitman, 4, pp. 329-331.
 1938b. Pitman, pp. 182-184 (reprint).
 1947. Witte & Laurent, p. 57, figs. 49-50.

Common Name. Mozambique Two-headed Snake (English).

Description. Rostral much broader than deep, the portion visible from above as long as about 2½ times in its distance from the frontal; nostril in a single nasal which is fused with the first

¹⁸⁶ Also exceeded by a Kilwa ♀ (Brit. Mus.) measuring 410 (390.5 + 19.5) mm. which, however, may represent an undescribed subspecies.

¹⁸⁷ Unless this Kilwa ♀ proves to be subspecifically distinct. Kilwa is 125 miles northeast of Liwale.

labial, so borders the mouth; prefrontals longer than broad, entering the orbit; frontal shorter than its distance from the rostral, slightly longer than broad, twice as broad as a supra-ocular, much shorter than a parietal; preocular 1, minute; eye small, its diameter equal to its distance from the mouth; post-ocular 1, moderate; upper temporal large, bordering a parietal; upper labials 4 (if the nasolabial be considered the first), second in contact with a prefrontal, third entering the orbit, fourth largest and broadly in contact with a parietal; lower labials 5, the first broadly in contact with its fellow behind the mental, 3 labials in contact with the anterior sublinguals, which are small and subequal to the posterior.

Midbody scales smooth, in 15 rows; ventrals 269 (in only known ♀); anal divided; subcaudals 21 (in ♀).

Color in alcohol. Above, head and neck black, the black descending on the sides of the neck suggesting a collar; labials yellow; occiput bearing two small white spots; back yellowish white with a ladder-like, dark brown, vertebral stripe; a dark dorsolateral stripe on the adjacent halves of the fifth and sixth scale-rows, a narrow brown lateral stripe between the third and fourth scale-rows, lower lateral scales faintly edged with brown; posterior half of tail black. Below, throat and belly immaculate yellowish white; a black bar across posterior half of tail separates off a light area near the tip.

Size. Total length of holotype ♀ (B.M. 1918.11.20.1) 280 (264 + 16) mm.; tail length included in total length of ♀ 17.5 times. Midbody diameter 3 mm.

Dentition. Pterygoid teeth absent in type (*vide* Parker).

Defense. The defense of this genus was illustrated by the fact that the killer of the type had been induced to strike at the tail, so closely did it resemble the head and act as a directive mark, writes Hale Carpenter, who found it lying dead in the road through the British military camp behind Port Amelia, August, 1918.

Localities. **Mozambique:** Ancnabe (Anquabe; Ankwabe), which is 13°02' S., 39°55' E.

Range. Mozambique.

BIBLIOGRAPHY¹⁸⁸

A total of 345 works (1803-1956) by 126 authors in which have been found references to the species of snakes discussed in the preceding pages. No attempt has been made to complete citations appearing prior to 1880.

ADERS, W. M.

1920. *In* F. B. Pearce, Zanzibar: The Island Metropolis of Eastern Africa (London), pp. 326-343.

AGASSIZ, LOUIS

1848. *Nomenclator Zoologicus: Index Universalis* (Solofuri "1846"), pp. 1-393.

AMARAL, A. DO See T. BARBOUR and A. DO AMARAL

ANDERSSON, L. G.

1901. Bihang till K. Svenska Vet.-Akad. Handl., **27**, No. 5, pp. 1-26, pls. i-ii.
 1903b. *In* L. A. Jägerskiöld, Results of the Swedish Zoological Expedition to Egypt and the White Nile 1901 (Upsala 1904), **1**, No. 4, pp. 1-12 (reprints appeared in 1903).
 1916. Göteborgs Kungl. Vetensk.-Vitterh.-Samhälles Handl., (4) **17**, No. 5, pp. 1-41.
 1937. *Arkiv Zool.*, **29A**, No. 16, pp. 1-28, figs. 1-8.
 See also E. LÖNNBERG and L. G. ANDERSSON

ANGEL, FERNAND

- 1920a. *Bull. Mus. Hist. Nat. (Paris)*, **26**, pp. 197-199, figs. 1-3.
 1921a. *Bull. Mus. Hist. Nat. (Paris)*, **27**, pp. 42-44, figs. 1-3.
 1922a. *Bull. Mus. Hist. Nat. (Paris)*, **28**, pp. 39-41.
 1923d. *In* Mission Rohan-Chabot. Angola et Rhodesia (1912-1914) (Paris), **4**, pp. 157-169, figs. 1-12, pl. —, figs. 1-2.
 1925a. *In* Voyage de Ch. Alluaud et R. Jeannel en Afrique Orientale (1911-1912). Résultats scientifiques. Vertebrata. (Paris), **2**, pp. 1-63, figs. 1-5, pls. i-iii.
 1933b. *Bull. Mus. Hist. Nat. (Paris)*, (2) **5**, pp. 68-69.
 1933f. *Les Serpents de l'Afrique Occidentale française*. (Paris), pp. 1-246, figs. 1-83.

¹⁸⁸ Where a date is followed by a letter of the alphabet it indicates that during the year cited the author in question published more than one paper on African herpetology. The letter has chronological significance in a more comprehensive bibliography of African Herpetology (1880-1953) which it is hoped may be published in the not too-distant future.

ANGEL, F., J. GUIBÉ, M. LAMOTTE, and R. ROY

1954. *Mém. Inst. Français Afrique Noire*, No. 40, pp. 381-402, fig. 1.

ANGEL, F. and H. LIHOTE

1938. *Bull. Com. Etudes Hist. Sci. Afr. Occid. Franc.*, **21**, pp. 345-384.

AYLMER, G.

1922. *Sierra Leone Studies (Freetown)*, **5**, pp. 7-37.

BARBOUR, T. and A. DO AMARAL

1927. *Bull. Antivenin Inst. Amer.*, **1**, pp. 25-27.

BARBOUR, T. and A. LOVERIDGE

1928e. *Mem. Mus. Comp. Zool.*, **50**, pp. 87-265, pls. i-iv.

1930a. *In* Richard Strong, Report of the Harvard-African Expedition upon the African Republic of Liberia and the Belgian Congo. (Cambridge, Mass.), **2**, pp. 769-786, pls. i-ii.

BATEMAN, G. C.

1897. *The Vivarium (London)*, pp. 1-424, figs. 1-98, pl. —.

BATTERSBY, J. C.

1950. *Ann. Mag. Nat. Hist.*, (12) **3**, pp. 413-417, fig.

1951. *Ann. Mag. Nat. Hist.*, (12) **4**, pp. 828-829.

1954. *Ann. Mag. Nat. Hist.*, (12) **7**, pp. 241-248.

BEDRIAGA, J. V.

1892. *O. Inst. Rev. Sci. Litt. (Coimbra)*, **39**, pp. 498-507, 642-648, 736-742, 814-820, 901-907.

BIANCONI, J. J.

1859. *Specimina zoologica mosambicana (Bononiae)*, pp. 1-282,

1862. pls. i-xvii.

BIBRON, G. See A. M. C. DUMÉRIL and G. BIBRON

BLAIR, J. A. and J. GRAHAM

1954. *Biochem. Journ.*, **56**, pp. 286-287, figs. 1-3.

BLOM-BJØRNER, SIDNEY

1946. *Journ. E. Africa Uganda Nat. Hist. Soc.*, **18**, (1945), p. 159.

BOCAGE, J. V. B. DU

- 1866a. *Jorn. Sci. Lisboa*, **1**, pp. 37-56.
1866b. *Jorn. Sci. Lisboa*, **1**, pp. 57-78, pl. i.
1867a. *Jorn. Sci. Lisboa*, **1**, pp. 217-228.
1872. *Jorn. Sci. Lisboa*, **4**, pp. 72-82, fig.
1873b. *Jorn. Sci. Lisboa*, **4**, pp. 209-227.
1879a. *Jorn. Sci. Lisboa*, **7**, pp. 85-96.
1882a. *Jorn. Sci. Lisboa*, **8**, pp. 286-290.
1882b. *Jorn. Sci. Lisboa*, **8**, pp. 299-304.
1882c. *Jorn. Sci. Lisboa*, **9**, pp. 1-19, figs. 1-6.
1886a. *Jorn. Sci. Lisboa*, **11**, pp. 65-70.
1887a. *Jorn. Sci. Lisboa*, **11**, pp. 177-211.
1892a. *Jorn. Sci. Lisboa*, (2) **2**, pp. 179-184.
1893a. *Jorn. Sci. Lisboa*, (2) **3**, pp. 45-46.
1893b. *Jorn. Sci. Lisboa*, (2) **3**, pp. 47-48.
1893d. *Jorn. Sci. Lisboa*, (2) **3**, pp. 141-144.
1895a. *Herpetologie d'Angola et du Congo (Lisboa)*, pp. xx + 203,
pls. i-xix.
1895e. *Jorn. Sci. Lisboa*, (2) **4**, pp. 1-15.
1896a. *Jorn. Sci. Lisboa*, (2) **4**, pp. 65-104, pls. i-ii.
1896b. *Jorn. Sci. Lisboa*, (2) **4**, pp. 105-114.
1896c. *Jorn. Sci. Lisboa*, (2) **4**, pp. 115-120.
1896e. *Jorn. Sci. Lisboa*, (2) **4**, pp. 176-178.
1897a. *Jorn. Sci. Lisboa*, (2) **4**, pp. 187-206.
1903a. *Jorn. Sci. Lisboa*, (2) **7**, pp. 25-59.
1905. *Jorn. Sci. Lisboa*, (2) **7**, pp. 65-96.

BOETTGER, OSKAR

- 1881b. *Abhand. Senckenberg. Naturf. Ges.*, **12**, pp. 393-418, pl. i.
1887b. *Ber. Senckenberg. Naturf. Ges.*, pp. 135-173, pl. v.
1888a. *Ber. Senckenberg. Naturf. Ges.*, pp. 3-108, pls. i-ii.
1889. *Ber. Senckenberg. Naturf. Ges.*, pp. 267-316.
1893b. *Zool. Anz.*, **16**, pp. 113-119 + 129-132.
1898. *Katalog der Reptilien-Sammlung im Museum der Senckenbergischen Naturforschenden Gesellschaft in Frankfurt am Main. II. Schlangen (Frankfurt a. M.)*, ix + 160 pp.
1913. *In A. Voeltzkow, 1908-1917, Reise in Ostafrika (Stuttgart)*, **3**, pp. 269-376, pls. xxiii-xxx.

BOGERT, C. M.

1940. *Bull. Amer. Mus. Nat. Hist.*, **77**, pp. 1-107, figs. 1-18, pl. i.
1942b. *Amer. Mus. Novit.*, No. 1178, pp. 1-5.

BOULENGER, G. A.

- 1887h. *Zoologist* (London), (3) **11**, pp. 171-182.
 1890. *Fauna British India, Rept. & Batr.*, xviii + 541 pp., figs. 1-142.
 1891a. *Proc. Zool. Soc. London*, pp. 305-309.
 1892a. *In* W. L. Distant, *A Naturalist in the Transvaal* (London), pp. 174-176, fig. —.
 1893b. *Catalogue of Snakes in the British Museum (Natural History)* (London), **1**, xiii + 448 pp., figs. 1-26, pls. i-xxviii.
 1894a. *Catalogue of Snakes in the British Museum (Natural History)* (London), **2**, xi + 382 pp., figs. 1-25, pls. i-xx.
 1895f. *Ann. Mag. Nat. Hist.*, (6) **16**, pp. 32-34.
 1895h. *Ann. Mag. Nat. Hist.*, (6) **16**, pp. 171-173.
 1896a. *Ann. Mus. Civ. Stor. Nat. Genova*, (2) **16**, pp. 545-554.
 1896b. *Ann. Mus. Civ. Stor. Nat. Genova*, (2) **17**, pp. 1-14, pl. i.
 1896c. *Ann. Mus. Civ. Stor. Nat. Genova*, (2) **17**, pp. 15-23.
 1896d. *Catalogue of Snakes in the British Museum (Natural History)* (London), **3**, xiv + 727 pp., figs. 1-37, pls. i-xxv.
 1896e. *Proc. Zool. Soc. London*, pp. 212-217, pls. vii-viii.
 1897b. *Ann. Mag. Nat. Hist.*, (6) **19**, pp. 276-281, fig. —.
 1897d. *Ann. Mag. Nat. Hist.*, (6) **20**, pp. 374-376.
 1897e. *Proc. Zool. Soc. London*, pp. 800-803, pl. xlvi.
 1897g. *Ann. Mus. Civ. Stor. Nat. Genova*, (2) **17**, pp. 275-280.
 1898a. *Ann. Mus. Civ. Stor. Nat. Genova*, (2) **18**, pp. 715-723, pls. ix-x.
 1900b. *Proc. Zool. Soc. London*, pp. 433-456, figs. 1-2, pls. xxvii-xxxii.
 1901g. *Ann. Mus. Congo, Zool.* (1) **2**, pp. 1-14, pls. i-v.
 1902b. *Proc. Zool. Soc. London*, **2**, pp. 13-18, pls. ii-iv.
 1902d. *In* H. H. Johnston, *The Uganda Protectorate* (London), **1**, pp. 445-447.
 1905e. *Ann. Mag. Nat. Hist.*, (7) **16**, pp. 105-115, pl. iv.
 1905f. *Mem. Real Soc. Esp. Hist. Nat.* (Madrid), **1**, pp. 183-186.
 1905h. *Proc. Zool. Soc. London*, pp. 248-255.
 1906i. *Ann. Mus. Civ. Stor. Nat. Genova*, (3) **2**, pp. 196-216, figs. 1-9.
 1907a. *Mem. Proc. Lit. Philos. Soc. Manchester*, **51**, pp. 1-12.
 1907j. *Proc. Zool. Soc. London*, pp. 478-487, figs. 140-141, pls. xxi-xxii.
 1908b. *Ann. Natal Mus.*, **1**, pp. 219-235, figs. 1-3, pls. xxxv-xxxvi.
 1908c. *Ann. Mus. Civ. Stor. Nat. Genova*, (3) **4**, pp. 5-7, fig. —.
 1909a. *Ann. Mus. Civ. Stor. Nat. Genova*, (3) **4**, p. 193.
 1909b. *Ann. Mus. Civ. Stor. Nat. Genova*, (3) **4**, pp. 302-307.
 1909d. *Ann. Mus. Civ. Stor. Nat. Genova*, (3) **4**, pp. 310-311, fig. —.
 1909f. *Proc. Zool. Soc. London*, pp. 944-952, figs. 295-299.
 1909g. *Trans. Zool. Soc. London*, **19**, pp. 237-247, pls. viii-ix.
 1910b. *Ann. S. African Mus.*, **5**, pp. 455-538.

- 1911c. *Ann. Mus. Civ. Stor. Nat. Genova*, (3) **5**, pp. 161-169.
 1912b. *Ann. Mus. Civ. Stor. Nat. Genova*, (3) **5**, pp. 329-332.
 1912c. *In P. A. Talbot, In the Shadow of the Bush* (London & New York), p. 470.
 1913b. *Revue Zool. Afr.*, **3**, pp. 103-105, figs. —.
 1915a. *Proc. Zool. Soc. London*, pp. 193-223, figs. 1-2.
 1915e. *Proc. Zool. Soc. London*, pp. 611-640, figs. 1-3.
 1915d. *Proc. Zool. Soc. London*, pp. 641-658.
 1919a. *Proc. Zool. Soc. London* (Feb. 1920), pp. 267-298, figs. 1-3.
 1919g. *Revue Zool. Afr.*, **7**, pp. 1-29.

BRIEN, PAUL

1939. *Ann. Soc. Roy. Zool. Belgique*, **69**, pp. 119-137, map.

BUCHHOLZ, R. and W. K. H. PETERS

- 1875a. *Monatsb. Akad. Wiss. Berlin*, pp. 196-212, pls. i-iii.

BUTTIKÖFER, JOHANNES

1890. *Reisebilder aus Liberia*. **2**, *Die Bewohner Liberia's Thierwelt* (Leiden), pp. 435-447 and 478, pls. xix-xxxii.

CALABRESI, ENRICA

1916. *Monitore Zool. Ital. (Firenze)*, **27**, pp. 33-45, pl. ii.
 1918. *Monitore Zool. Ital. (Firenze)*, **29**, pp. 122-124.
 1925a. *Atti Soc. Ital. Sci. Nat. (Milano)*, **64**, pp. 100-109.
 1925b. *Atti Soc. Ital. Sci. Nat. (Milano)*, **64**, pp. 119-125, fig. —.
 1927. *Atti Soc. Ital. Sci. Nat. (Milano)*, **66**, pp. 14-60, pl. i.

CANSDALE, G. S.

- 1948d. *Nigerian Field*, **13**, pp. 43-50, photos.

CARPENTER, G. D. H.

1919. *Journ. E. Africa Uganda Nat. Hist. Soc.*, **15**, p. 496.
 1925. *A Naturalist in East Africa* (Oxford), pp. 1-187, figs. —, map, pls. i-viii.

CHABANAUD, PAUL

- 1916f. *Bull. Mus. Hist. Nat. (Paris)*, **22**, pp. 362-382, figs. 1-23.
 1916g. *Bull. Mus. Hist. Nat. (Paris)*, **22**, pp. 434-440, figs. 1-2.
 1917b. *Bull. Mus. Hist. Nat. (Paris)*, **23**, pp. 7-14, figs. 1-3.
 1917e. *Bull. Mus. Hist. Nat. (Paris)*, **23**, pp. 219-225, figs. 1-9.
 1918b. *Bull. Mus. Hist. Nat. (Paris)*, **24**, pp. 160-166.
 1919d. *Bull. Mus. Hist. Nat. (Paris)*, **25**, pp. 567-568.
 1921a. *Bull. Com. Études Hist. Sci. Occ. Franc. (Paris)*, pp. 445-472, map, pls. i-iv.
 1921d. *Bull. Mus. Hist. Nat. (Paris)*, **27**, pp. 519-525.

CHUBB, E. C.

1909a. Proc. Zool. Soc. London, pp. 590-597.

1909b. Rhodesia Mus. Bulawayo, 8th Ann. Report, pp. 34-36.

COPE, E. D.

1860. Proc. Acad. Nat. Sci. Philadelphia, pp. 241-266, 553-566.

1863. Amer. Journ. Sci. Arts, (2) **35**, pp. 455-458.

CORKILL, N. L.

1935a. Sudan Govt. Mus. (N.H.) Publ. No. 3 (Khartoum), pp. 1-40, map.

COTT, H. B.

1928. Proc. Zool. Soc. London, pp. 923-961, pls. i-iv.

1935. Proc. Zool. Soc. London, pp. 963-975, pl. i.

CUNHA, J. G. DE B. E.

1935. Mem. Estudos Mus. Zool. Univ. Coimbra, (1) No. 83, pp. 1-16.

1937. Compte Rendus XII Congrès Internat. Zool., Lisbonne, 1935, **3**, pp. 1777-1786.

DAUDIN, F. M.

1803c. Histoire naturelle, générale et particulière, des Reptiles (Paris), **7**, pp. 1-436, pls. lxxxi-xcii.

DEKEYSER, P. L. and A. VILLIERS

1954. Bull. Inst. Franc. Afrique Noire, **16** (A), pp. 957-970.

DOLLO, LOUIS

1886. Bull. Mus. Roy. Hist. Nat. Belgique, **4**, pp. 151-160, figs. —.

DUMÉRIL, A. H. A.

1860. Arch. Mus. Hist. Nat. (Paris), **10**, pp. 137-240, pls. xiii-xix (Sometimes cited as 1859 or 1861, but given as 1860 in Roy. Soc. Catalogue).

DUMÉRIL, A. M. C. and G. BIBRON

1854a. Erpétologie générale ou Histoire naturelle complete des Reptiles (Paris), **7a**, xvi + 780 pp., pls. lxiii-lxx.

FALK, KURT

1921. Wochensch. Aquar.-Terrarienkunde (Braunschweig), **18**, p. 177.

1922. Wochensch. Aquar.-Terrarienkunde (Braunschweig), **19**, pp. 160-164, figs. —.

FANTHAM, H. B. and A. PORTER

1950. Proc. Zool. Soc. London, **120**, pp. 599-646, pls. i-iii.

FERREIRA, J. B.

1898. Journ. Sci. Lisboa, (2) **5**, pp. 240-246.
1900. Journ. Sci. Lisboa, (2) **6**, pp. 49-53.
1902. Journ. Sci. Lisboa, (2) **6**, pp. 231-233.
1903a. Journ. Sci. Lisboa, (2) **7**, pp. 9-16.
1904. Journ. Sci. Lisboa, (2) **7**, pp. 111-117.
1905. Journ. Sci. Lisboa, (2) **7**, pp. 159-171, pl. —.

FISCHER, J. G.

1881. Abhand. naturwiss. Verein Bremen, **7**, pp. 225-238, pls. xiv-xvii.
1884a. Jahrb. Hamburg. Wiss. Anst., **1**, pp. 33-39, pl. iii.

FITZINGER, L. J. F. J. DE

1826. Neue Classification der Reptilien . . . Wien, viii + 66 pp., pl. i.
1843. Systema Reptilium . . . Fasciculus primus . . . (Vindobonae),
pp. 1-106.
1861. Sitzungsab. K. Akad. Wiss. Wien, **42**, pp. 383-416.

FITZSIMONS, F. W.

1912. The Snakes of South Africa; their Venom and the Treatment of Snake Bite (Cape Town, ed. 2; ed. 3 appeared in 1919) xvi + 547, figs. 1-162 + A-Z, col. frontis.

FITZSIMONS, V. F.

1932. Ann. Transvaal Mus., **15**, pp. 519-550.
1935b. Ann. Transvaal Mus., **16**, pp. 295-397, figs. 1-30, pls. x-xi.
1937a. Ann. Transvaal Mus., **17**, pp. 259-274, pl. x.
1938. Ann. Transvaal Mus., **19**, pp. 153-209, map, pls. ii-iv.
1939b. Ann. Transvaal Mus., **20**, pp. 17-46.
1946a. Ann. Transvaal Mus., **20**, pp. 351-377, pls. xiv-xvii.
1946b. Ann. Transvaal Mus., **20**, pp. 379-393.
1948a. Ann. Transvaal Mus., **21**, pp. 73-80, figs. 1-3, pl. i.

FLOWER, S. S.

1900. Proc. Zool. Soc. London, pp. 967-968.
1925b. Proc. Zool. Soc. London, pp. 911-981.
1929. In List of the Vertebrated Animals exhibited in the Gardens of the Zoological Society of London, 1828-1927. (London), **3**, pp. 1-272.
1933. Proc. Zool. Soc. London, pp. 745-851, map.

GENDRE, E.

1909. Comptes Rendus Soc. Linn. Bordeaux, **63**, pp. cv-cvi.

GOUGH, L. H.

1903. Zool. Jahrb. Syst., **17**, pp. 457-468.
1908. Ann. Transvaal Mus., **1**, pp. 17-45.

GRAHAM, J. See J. A. BLAIR and J. GRAHAM

GRAY, J. E.

1849. Catalogue of the Specimens of Snakes in the Collection of the British Museum (London), xvi + 125 pp.

GREEF, S. R.

1885. Sitzungsab. Ges. Bedförd. Naturw. Marburg, for 1884, pp. 41-80.

GUIBÉ, JEAN. See F. ANGEL and J. GUIBÉ

GÜNTHER, ALBERT

- 1858c. Catalogue of the Colubrine Snakes in the Collection of the British Museum (London), xvi + 281 pp.
1860a. Proc. Zool. Soc. London, pp. 427-430, figs. —.
1862b. Ann. Mag. Nat. Hist., (3) **9**, pp. 52-59, 124-132, pls. ix-x.
1863. Proc. Zool. Soc. London, pp. 16-17, fig. —.
1863c. Ann. Mag. Nat. Hist., (3) **11**, pp. 283-287.
1863d. Ann. Mag. Nat. Hist., (3) **12**, pp. 348-365, pls. v-vi.
1866a. Ann. Mag. Nat. Hist., (3) **18**, pp. 24-31, pls. vi-vii.
1868a. Ann. Mag. Nat. Hist., (4) **1**, pp. 413-429.
1869b. Zool. Record, **6**, pp. 105-122.
1872a. Ann. Mag. Nat. Hist., (4) **9**, pp. 13-37, pls. iii-vii.
1888a. Proc. Zool. Soc. London, pp. 50-51.
1888b. Ann. Mag. Nat. Hist. (6) **1**, pp. 332-335, pls. xviii-xix.
1893. Proc. Zool. Soc. London for 1892, pp. 555-558, pls. xxxiii-xxxv.
1894a. Proc. Zool. Soc. London for 1893, pp. 616-628, pls. liii-lvii.
1894b. Proc. Zool. Soc. London for 1893, pp. 628-632, pl. lviii.
1894c. Proc. Zool. Soc. London, pp. 84-88, pl. viii.
1895. Ann. Mag. Nat. Hist., (6) **15**, pp. 523-529, pl. xxi.
1896. Ann. Mag. Nat. Hist., (6) **17**, pp. 261-285.

HALLOWELL, EDWARD

1857. Proc. Acad. Nat. Sci. Philadelphia, pp. 48-72.

HECHT, GÜNTHER

1929. Zool. Anz., **81**, pp. 329-335.

HEWITT, JOHN

- 1910a. *Ann. Transvaal Mus.*, **2**, pp. 50-71.
1910b. *Ann. Transvaal Mus.*, **2**, p. 73.
1912. *Rec. Albany Mus.*, **2**, pp. 264-285.
1914a. *S. Afr. Journ. Sci.*, **10**, pp. 238-253, maps.
1937c. *In A Guide to the Vertebrate Fauna of the Eastern Cape Province, S. Africa (Grahamstown)*, pp. 1-118 and G-H, pls. i-xxviii.
See also P. A. Methuen and J. Hewitt.

HEWITT, J. and J. H. POWER

1913. *Trans. Roy. Soc. S. Africa*, **3**, pp. 147-176.

HOBLEY, C. W.

1912. *Journ. E. Afr. Uganda Nat. Hist. Soc.*, No. 5, pp. 43-56, figs. —.

IONIDES, C. J. P.

1947. *Journ. E. Africa Nat. Hist. Soc. for 1946*, **19**, p. 70.
1948. *In M. S. Moore, Ann. Rep. Game Pres. Dept. Tanganyika Terr. for 1947*, pp. 10-11.
1950. *Tanganyika Notes and Records*, No. 29, pp. 98-108, figs. 1-8.
1952a. *In G. H. Swynnerton, Ann. Rep. Game Dept. Tanganyika Terr. for 1950*, pp. 9-10.

JAN, GEORG

1862. *Arch. Zool. Anat. Fisiol. (Modena)*, **2**, pp. 1-76, pls. v, vii, xvii, xviii.
1863a. *Arch. Zool. Anat. Fisiol. (Modena)*, **2**, pp. 213-330.
1866. *Iconographie générale des Ophidiens (Milano)*, No. 16, pls. i-vi.
1869. *Loc. cit.*, No. 32, pls. i-vi.
1876. *Loc. cit.*, No. 48, pls. i-vi.
1881. *Loc. cit.*, No. 50, pls. i-vi.

JEUDE, T. W. VAN LIDTH DE

1895. *Notes Leyden Mus.*, **16**, pp. 227-230.

JOHNSTON, H. H.

1897. *British Central Africa (London)*, xx + 544 pp., 220 illus., 6 maps.
1898. Second edition of 1897 with some changes in pagination.

KINGDON, J.

1948. *Bull. E. Africa Nat. Hist. Soc.*, No. 7, p. 10.

KLAPTOCZ, ADALBERT

1913. *Zool. Jahrb. Syst.*, **34**, pp. 279-290.

LACÉPÈDE, B. G. E. DE

1789. Histoire naturelle des Quadrupèdes ovipares et des Serpents (Paris), **2**, pp. 1-527, pls. i-xxii.

LAMOTTE, MAXIME. See F. ANGEL and M. LAMOTTE

LAMPE, EDUARD

1902. Jahrb. Nassau. Ver. Naturk. (Wiesbaden), **55**, pp. 1-66.
1911. Jahrb. Nassau. Ver. Naturk. (Wiesbaden), **64**, pp. 137-236.

LAURENT, RAYMOND

- 1947c. Bull. Mus. Roy. Hist. Nat. Belgique, **23**, No. 16, pp. 1-12.
1947g. Bull. Cercle Zool. Congo, **18**, pp. 39-40.
1950b. Revue Zool. Bot. Afr., **43**, pp. 349-352.
1950f. Serv. Cult. Comp. Diam. Angola, Museu Dondo No. 10, pp. 7-17.
1952b. Revue Zool. Bot. Afr., **45**, pp. 198-203.
1953a. Bull. Cercle Zool. Congolais, **21**, pp. 21-29.
1954b. Serv. Cult. Comp. Diam. Angola, Museu Dondo No. 23, pp. 35-84, figs. 1-23.
1954d. Bull. Soc. Zool. France, **79**, pp. 290-310.
1956. Ann. Mus. Roy. Congo Belge, Sci. Zool., **48**, pp. 1-390, figs. 1-50, pls. i-xxi.

LEACH, W. E.

1819. *In* T. E. Bowdich, Mission from Cape Coast Castle to Ashantee . . . (London), Appendix IV, p. 494.

LEESON, FRANK

1945. Key to Gold Coast Snakes having Colubride-Type Head-Shields (Acera), pp. 1-6.
1950. Identification of Snakes of the Gold Coast (London), x + 142 pp., figs. 1-65, pls. i-xxxiii.

LEPRI, GIUSEPPE

1911. Boll. Soc. Zool. Ital. Roma for 1910, (2) **11**, pp. 317-328.

LHOTE, H. See F. ANGEL and H. LHOTE

LICHTENSTEIN, M. H. C.

1823. Verzeichniss der Dubletten des Zoologischen Museums der . . . Universität . . . (Berlin), x + 118, pl. —.

LINDHOLM, W. A.

1902. *In* E. Lampe, Jahrb. Nassau. Ver. Naturk. (Wiesbaden), **55**, pp. 1-66.

LÖNNBERG, EINAR

- 1907, *In* Y. Sjöstedt, *Wissenschaftliche Ergebnisse der Schwedischen Zoologischen Expedition nach dem Kilimandjaro, dem Meru und den umgebenden Massaistepfen 1905-1906* (Uppsala), No. 4, pp. 1-28, pl. i.
 1910. *Arkiv Zool.*, **7**, No. 8, pp. 1-8.
 1911. *K. Svenska. Vetensk.-Akad. Handl.* (Stockholm), **47**, No. 6, pp. 1-42, pls. i-ii.

LÖNNBERG, E. and L. G. ANDERSSON

1913. *Arkiv Zool.*, **8**, No. 20, pp. 1-6.

LOVERIDGE, ARTHUR

- 1916a. *Journ. E. Africa Uganda Nat. Hist. Soc.*, **5**, pp. 77-87.
 1916b. *Journ. E. Africa Uganda Nat. Hist. Soc.*, **5**, pp. 109-124.
 1917b. *Journ. E. Africa Uganda Nat. Hist. Soc.*, **6**, pp. 170-185.
 1918a. *Journ. E. Africa Uganda Nat. Hist. Soc.*, No. 13, pp. 315-338.
 1923b. *Journ. Tanganyika European Civil Serv. Assoc.*, pp. 10-28.
 1923c. *Proc. Zool. Soc. London*, pp. 871-897.
 1924b. *Journ. E. Africa Uganda Nat. Hist. Soc.*, *Spec. Suppl. No. 3*, pp. 1-16.
 1925a. *Proc. Zool. Soc. London*, pp. 71-74.
 1928d. *Proc. U. S. Nat. Mus.*, **73**, Art. 17, pp. 1-69, pls. i-iv.
 1928g. *Bull. Antivenin Inst. Amer.*, **2**, pp. 32-41, figs. 5-6.
 1928j. *Bull. Antivenin Inst. Amer.*, **2**, pp. 72-76.
 1929h. *Bull. U. S. Nat. Mus.*, No. 151, pp. 1-135, pl. 1.
 1933h. *Bull. Mus. Comp. Zool.*, **74**, pp. 197-416, pls. i-iii.
 1935c. *Bull. Mus. Comp. Zool.*, **79**, pp. 1-19.
 1936h. *Field Mus. Nat. Hist., Zool. Ser.*, **22**, pp. 1-111.
 1936j. *Bull. Mus. Comp. Zool.*, **79**, pp. 209-337, pls. i-ix.
 1937c. *Proc. Acad. Nat. Sci. Philadelphia*, **89**, pp. 265-296.
 1937f. *Bull. Mus. Comp. Zool.*, **79**, pp. 481-541, pls. i-iv.
 1938d. *Proc. New England Zool. Club*, **17**, pp. 49-74.
 1941e. *Proc. U. S. Nat. Mus.*, **91**, pp. 113-140.
 1942e. *Bull. Mus. Comp. Zool.*, **91**, pp. 237-373, pls. i-vi.
 1942g. *Fauna (Philadelphia)*, **4**, pp. 118-121, figs.
 1945b. *Notulae Naturae Acad. Nat. Sci. Philadelphia*, No. 151, pp. 1-4.
 1946a. *Journ. E. Africa Nat. Hist. Soc.*, **18**, pp. 97-115, figs. 1-4.
 1951a. *Bull. Mus. Comp. Zool.*, **106**, pp. 177-204, fig. —.
 1951e. *Bull. Inst. Roy. Soc. Nat. Belgique*, **27**, pp. 1-12.
 1951d. *Bull. Zool. Nomencl.*, **6**, pp. 88-89.
 1953e. *Bull. Mus. Comp. Zool.*, **110**, pp. 141-322, pls. i-v.
 1953h. *Quart. Journ. Florida Acad. Sci.*, **16**, pp. 139-150, photo.

- 1955e. Journ. E. Africa Nat. Hist. Soc., **22**, pp. 168-198, fig. —.
 1956c. Sudan Notes Records for 1955, **36**, pp. 37-56, map.
 1957a. Tanganyika Notes Records, No. 43, pp. 1-19.
 See also T. BARBOUR and A. LOVERIDGE

MATSCHIE, PAUL

- 1891a. Zool. Jahrb. Syst., **5**, pp. 605-611.
 1891b. Zool. Jahrb. Syst., **5**, pp. 612-618.
 1892. Sitzungsber. Ges. Naturf. Freunde Berlin, pp. 101-110.
 1893c. Mitt. Fors. Ges. deutschen Schutzgeb., **6**, pp. 207-215.

MEEK, S. E.

1897. Field Columbian Mus., Zool. Ser., **1**, pp. 161-184, fig. —
 1910. Field Mus. Nat. Hist., Zool. Ser., **7**, pp. 403-414.

MERTENS, ROBERT

- 1926a. Senckenbergiana, **8**, pp. 137-155.
 1934c. Zoologica (Stuttgart), **32**, No. 84, pp. 1-210, pls. i-vi.
 1937b. Abhand. Senckenberg. Naturf. Ges., No. 435, pp. 1-23.
 1938b. Abhand. Senckenberg. Naturf. Ges., No. 442, pp. 1-52, pls. i-x.
 1938e. Senckenbergiana, **20**, pp. 425-442, figs. 1-6.
 1940a. Zool. Anz., **131**, pp. 239-250, fig. —.
 1941. Zool. Anz., **135**, pp. 275-281.
 1946b. Abhand. Senckenberg. Naturf. Ges., No. 471, pp. 1-88, pls. i-viii.
 1955a. Abhand. Senckenberg. Naturf. Ges., No. 490, pp. 1-172, map, pls. i-xxiv.

METHUEN, P. A. and J. HEWITT

- 1914b. Ann. Transvaal Mus., **4**, pp. 118-145, figs. 14-16, pl. xiv.

MOCQUARD, FRANÇOIS

- 1887b. Bull. Soc. Philom. Paris, (7) **11**, pp. 62-92, pls. i-ii.
 1888. Mém. Soc. Philom. Paris, Cent., pp. 109-134, pls. xi-xii.
 1896b. Compte-Rendu Soc. Philom. Paris, No. 19, pp. 44-45.
 1896c. Bull. Mus. Hist. Nat. (Paris), **2**, pp. 59-60.
 1897b. Bull. Soc. Philom. Paris, (8) **9**, pp. 5-20.
 1899a. Bull. Mus. Hist. Nat. (Paris), **5**, pp. 218-219.
 1902b. Bull. Mus. Hist. Nat. (Paris), **8**, pp. 404-417.
 1906b. Bull. Mus. Hist. Nat. (Paris), **12**, pp. 247-253.
 1906c. Bull. Mus. Hist. Nat. (Paris), **12**, pp. 464-467.
 1908b. *In* E. Foá, Résultats scientifiques des Voyages en Afrique d'Edouard Foá (Paris), pp. 557-558, map.

MONARD, ALBERT

1931. Bull. Soc. Neuchâtel. Sci. Nat., **55**, pp. 89-111, figs. 1-5.
1937b. Arqu. Museu Bocage (Lisboa), **8**, pp. 1-154, figs. 1-3.
1940b. Arqu. Museu Bocage (Lisboa), **11**, pp. 147-180, figs. 1-7, pls. i-ii.
1951. Mém. Inst. Franç. Afrique Noire, No. 1, pp. 123-185, figs. —.

MOREAU, R. E. and R. H. W. PAKENHAM

1941. Proc. Zool. Soc. London for 1940, **110** (A), pp. 97-128, fig. 1.
1942. Proc. Zool. Soc. London, **112**, (A), pp. 61-63.

MORRISON, F. D. See G. L. ORTON and F. D. MORRISON

MÜLLER, FRIEDERICH

- 1882a. Verhandl. Naturf. Ges. Basel, **7**, pp. 120-165, pls. ix-xi.
1882b. Verhandl. Naturf. Ges. Basel, **7**, pp. 166-174.
1884. Verhandl. Naturf. Ges. Basel, **7**, pp. 274-299.
1885. Verhandl. Naturf. Ges. Basel, **7**, pp. 668-717, pls. ix-xi.
1890. Verhandl. Naturf. Ges. Basel, **8**, pp. 685-705, pl. x.

MÜLLER, LORENZ

1910. Bayer. Akad. Wiss., Kl. 2, **24**, pp. 543-626, pl. —.

NIEDEN, FRITZ

- 1911b. Sitzungsab. Ges. Naturf. Freunde Berlin for 1910, pp. 441-452.
See also R. STERNFELD and F. NIEDEN

ODHNER, TEODOR

1908. Arkiv Zool., **4**, No. 18, pp. 1-7.

ORTON, G. L. and F. D. MORRISON

1946. Copeia, pp. 15-17.

PAKENHAM, R. H. W.

1947. Ann. Mag. Nat. Hist., (11) **14**, pp. 134-140.
See also R. E. MOREAU and R. H. W. PAKENHAM
See also H. W. PARKER, R. E. MOREAU and H. W. PAKENHAM

PARENTI, PAOLO and LUIGI PICAGLIA

1886. Atti. Soc. Nat. Modena, (3) **5**, pp. 26-96.

PARKER, H. W.

- 1927b. Ann. Mag. Nat. Hist., (9) **20**, pp. 81-86, figs. 1-3.
1930b. Ann. Mag. Nat. Hist., (10) **6**, pp. 603-606.
1932a. Journ. Linn. Soc. London, Zool., **38**, pp. 213-229, figs. 1-10.

- 1932b. Proc. Zool. Soc. London, pp. 335-367, figs. 1-3.
 1936c. Novit. Zool. (Tring), **40**, pp. 115-146, pp. 1-2.
 1937a. Ann. Mag. Nat. Hist., (10) **20**, pp. 629-632.
 1949a. Zool. Verhand. Rijksmus. Natur. Hist. Leiden, pp. 1-116, figs. 1-11, map.

PARKER, H. W., R. E. MOREAU and R. H. W. PAKENHAM

1940. Ann. Mag. Nat. Hist., (11) **5**, pp. 309-314.

PERRACCA, M. G.

1896. Boll. Mus. Zool. Anat. Comp. Univ. Torino, **11**, No. 255, pp. 1-4, figs. —.
 1909. In Luigi Amedeo, Duc d'Abruzzi, Il Ruwenzori. Parte scientifica (Milano), **1**, pp. 165-180.
 1910. Boll. Mus. Zool. Anat. Comp. Univ. Torino, **25**, No. 624, pp. 1-6.
 1912. Ann. Museo Zool. Univ. Napoli, **3**, No. 25, pp. 1-8.

PETERS, W. K. H.

- 1854b. Monatsb. Akad. Wiss. Berlin, pp. 614-628.
 1855. Arch. Naturg., **21**, Abt. I, pp. 43-58 (reprint of 1954b).
 1861a. Monatsb. Akad. Wiss. Berlin, pp. 358-360.
 1866b. Monatsb. Akad. Wiss. Berlin, pp. 884-892.
 1867b. Monatsb. Akad. Wiss. Berlin, pp. 234-237, pl. —.
 1869a. In C. C. von der Decken, Reisen in Ost-Afrika (Leipzig), **3**, Abt. 1, pp. 11-18, pls. i-ii.
 1869b. Ofver. K. Vet.-Akad. Förh., pp. 657-662.
 1870b. Monatsb. Akad. Wiss. Berlin, pp. 110-115, pl. —.
 1871a. Monatsb. Akad. Wiss. Berlin, pp. 566-581.
 1875a. Monatsb. Akad. Wiss. Berlin, pp. 196-212, pls. i-iii.
 1876a. Monatsb. Akad. Wiss. Berlin, pp. 117-123, pl. i.
 1877c. Monatsb. Akad. Wiss. Berlin, pp. 611-621, pl. —.
 1878a. Monatsb. Akad. Wiss. Berlin, pp. 194-209, pls. i-ii.
 1881d. Sitzungsber. Ges. Naturf. Freunde Berlin, pp. 147-150.
 1882a. Naturwissenschaftliche Reise nach Mossambique auf Befehl seiner Majestät des Königs Friedrich Wilhelm IV in den Jahren 1842 bis 1848 ausgeführt. Zoologie, **3**, Amphibien. (Berlin), xv + 191 pp., pls. i-xxx.

See also R. BUCHHOLZ and W. K. H. PETERS

PEFFER, GEORG

1889. Jahrb. Hamburg. Wiss. Anst., **6**, pp. 1-38.
 1893. Jahrb. Hamburg. Wiss. Anst., **10**, pp. 71-105, pls. i-ii.

PHISALIX, MARIE

- 1917a. Bull. Mus. Hist. Nat. (Paris), **23**, pp. 331-336.

PITMAN, C. R. S.

1929. Proc. Zool. Soc. London, pp. 133-146.
1934. Report on a Faunal Survey of Northern Rhodesia (Livingstone), pp. 292-312, index i-xxxii, maps.
1936. Uganda Journal (Kampala), **3**, pp. 211-229, 259-281, pls. iii-v; **4**, pp. 41-61, 126-150, pls. vi-x, col. pls. A-G.
1937. Uganda Journal (Kampala), **4**, pp. 319-349, pl. xiii, col. pls. L-M.
1938a. Uganda Journal (Kampala), **5**, pp. 160-224, pls. xv-xviii, col. pls. R-W, diagrams I-II.
1938b. A Guide to the Snakes of Uganda (Kampala), xxi + 362, diagrams I-II, maps, pls. i-xxviii, col. pls. A-Q (reprint of preceding articles in book form).

PORTER, A. See H. B. FANTHAM and A. PORTER

POWER, J. H.

- 1927c. Trans. Roy. Soc. S. Africa, **14**, pp. 405-422, fig. 1, map, pls. xviii-xxii.
1931. Trans. Roy. Soc. S. Africa, **20**, pp. 39-49, figs. 1-2.
1935. Proc. Zool. Soc. London, pp. 333-346, figs. 1-10, pl. i.
See also J. HEWITT and J. H. POWER

PRATO, ALBERTO DEL

1893. Le Raccolte zoologiche fatte nel Congo dal Cav. Giuseppe Corona (privately printed pamphlet. Premiata Casa Editrice L. Battei. Parma), pp. 1-14.

REICHENOW, ANTON

1874. Arch. Naturg., **40**, Abt. 1, pp. 287-298, pl. ix.

REINHARDT, J. T.

1843. K. Danske Vidensk. Selsk. Aftandl., **10**, pp. 233-277, pls. i-iii.

ROCHEBRUNE, A. T. DE

- 1884a. Faune de la Sénégambie. Reptiles. (Paris), pp. 1-221, pls. i-xx (a totally unreliable work).

ROSE, WALTER

1929. Veld and Vlei (Cape Town), xxiii + 240, figs. —, photos 1-125.
1950. The Reptiles and Amphibians of Southern Africa (Cape Town), xxviii + 378 pp., frontis. and photos 1-213.
1955. Snakes — Mainly South African. (Cape Town), xvi + 213 pp., frontis. and 89 + 34 figs.

ROUX, JEAN

- 1907a. *Revue Suisse Zool. (Genève)*, **15**, pp. 75-86.
 1907c. *Zool. Jahrb. Syst.*, **25**, pp. 403-444, pls. xiv-xv.
 1910. *Revue Suisse Zool. (Genève)*, **18**, pp. 95-103.

ROY, R. See F. ANGEL, . . . and R. ROY

SAUVAGE, H. E.

- 1884b. *Bull. Soc. Zool. France*, **9**, pp. 199-208, pl. vi.

SCHENKEL, EHRENFRIED

1901. *Verhandl. Naturf. Ges. Basel*, **13**, pp. 142-199.

SCHLEGEL, HERMANN

1837. *Essai sur la Physionomie des Serpens. (Leide)*, **1**, xxviii + 251 + xvi pp.; **2**, xvi + 606 pp.; Atlas with maps 1-3; pls. i-xxi.

SCHMIDT, K. P.

1923. *Bull. Amer. Mus. Nat. Hist.*, **49**, 1-148 pp., figs. 1-15, maps 1-19, pls. i-xxii.
 1933. *Ann. Carnegie Mus.*, **22**, pp. 1-15, figs. 1-2, pls. i-ii.

SCHOUTEDEN, HENRI

1933. *Revue Zool. Bot. Afr.*, **23**, pp. 233-238.

SCHWETZ, J.

- 1934a. *Revue Zool. Bot. Afr.*, **25**, pp. 379-384.
 1934b. *Revue Zool. Bot. Afr.*, **26**, Suppl., pp. 23-25.

SCLATER, W. L.

1898. *Ann. S. African Mus.*, **1**, pp. 95-111, pl. v.

SCORTECCI, GIUSEPPE

- 1929c. *Atti Soc. Ital. Sci. Nat. (Milano)*, **68**, pp. 245-278, figs. —, pl. xii.
 1930a. *Atti Soc. Ital. Sci. Nat. (Milano)*, **69**, pp. 193-217, figs. —.
 1930c. *Boll. Mus. Zool. Anat. Univ. Torino*, (3) **41**, No. 10, pp. 1-26, figs. —.
 1931c. *Atti Soc. Ital. Sci. Nat. (Milano)*, **70**, pp. 203-215.
 1932b. *Atti Soc. Ital. Sci. Nat. (Milano)*, **71**, pp. 39-49, figs. —.
 1939a. *Ann. Mus. Civ. Stor. Genova*, **63**, pp. 263-291.
 1940a. *In Missione biologica nel paese dei Borana raccolte zoologiche. (Reale Accad. d'Italia, Roma)*, **2**, pp. 125-150 (repaged 5-30 in separate).
 1943. *In Missione biologica Sagan-Omo, Zool. (Roma)*, pp. 267-305, figs. 1-5.

SJÖSTEDT, YNGVE

1897. Bihang till K. Svenska Vet.-Akad. Handl., **23**, Part 4, No. 2, pp. 1-36, pls. i-iii.

SMITH, SIR A.

- 1838- Illustrations of the Zoology of South Africa, Reptiles. (London), pls. i-lxxviii, App., pp. 1-28.

SMITH, M. A.

1928. Ann. Mag. Nat. Hist., (10) **1**, pp. 494-497.

SOMEREN, V. G. L. VAN

1939. Journ. E. Afr. Uganda Nat. Hist. Soc., **14**, pp. 155-160.

STEINDACHNER, FRANZ

- 1867a. Reise der österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859, unter den Befehlen des Commodore B. von Willerstorf-Urbair. Zool., **1**, 1-98 pp., pls. i-iii.

STEJNEGER, LEONHARD

- 1893b. Proc. U. S. Nat. Mus., **16**, pp. 711-741.

STERNFELD, ROBERT

1908. Sitzb. Ges. Naturf. Freunde Berlin, pp. 92-95.
1908a. Mitt. Zool. Mus. Berlin, **3**, pp. 397-432.
1908b. Mitt. Zool. Mus. Berlin, **4**, pp. 207-236.
1908c. Mitt. Zool. Mus. Berlin, **4**, pp. 237-247.
1909a. In Die Fauna der deutschen Kolonien. (Berlin), Ser. 2, pt. 1, pp. iv + 29, figs. 1-42, map.
1909b. In Die Fauna der deutschen Kolonien. (Berlin), Ser. 1, pt. 1, pp. iv + 28, figs. 1-34, map.
1910a. In Die Fauna der deutschen Kolonien. (Berlin), Ser. 3, pt. 2, pp. iv + 47, figs. 1-54, map. (N. B. 1910d actually antedates 1910a).
1910b. In Die Fauna der deutschen Kolonien. (Berlin), Ser. 4, pt. 1, pp. iv + 45, figs. 1-50, map.
1910c. Mitt. Zool. Mus. Berlin, **5**, pp. 51-56.
1910d. Mitt. Zool. Mus. Berlin, **5**, pp. 61-65.
1911a. Sitzb. Ges. Naturf. Freunde Berlin, pp. 245-251.
1911b. Mitt. Zool. Mus. Berlin, **5**, pp. 393-411.
1912c. In Wiss. Ergeb. der deutschen Zentral-Afrika-Expedition 1907- (1913) 1908. (Leipzig, 1913, but separate 1912), **4**, pp. 197-279, figs. 1-4, pls. vi-ix.
1917. In Wiss. Ergeb. der zweiten deutschen Zentral-Afrika-Expedition 1910-1911. (Leipzig, 1917), **1**, pp. 407-510, pls. xxii-xxiv.

STERNFELD, ROBERT, and FRITZ NIEDEN

1911. Mitt. Zool. Mus. Berlin, **5**, pp. 383-385.

THEMIDO, A. A.

1941. Mem. Estudos Mus. Zool. Univ. Coimbra, (1), No. 119, pp. 1-32.

THEOBALD, WILLIAM

1868. Journ. Asiatic Soc. Bengal, Extra No., pp. 1-88, App. 1-111, 4 pls. —.
1876. Descriptive Catalogue of the Reptiles of British India (Calcutta), x + 238 pp., Syn. i-xxxviii, App. i-xiii, 5 pls. (6 in M. C. Z. copy).

TORNIER, GUSTAV

1896. Die Kriechthiere Deutsch-Ost-Afrikas, Beiträge zur Systematik also und Descendenzlehre. (Berlin, reprinted 1897) xiii + 164 pp., 1897. figs. 1-11, pls. i-v.
- 1897b. Arch. Naturg., **63**, Abt. 1, pp. 63-66.
1898. In C. W. Werther, Die mittleren Hochländer des nördlichen Deutsch-Ost-Afrika. (Berlin), pp. 281-304, figs. 1-15.

TRAILL, T. S.

1843. In H. Schlegel, Essay on the Physiognomy of Serpents (London), vii + 254 pp., pls. i-iii.

UTHMÖLLER, WOLFGANG

1937. Temminckia (Leiden), **2**, pp. 97-134, maps.
1938. Zool. Anz., **124**, pp. 41-48.
- 1941a. Arch. Naturg., (2) **10**, Abt. 1, pp. 1-70, figs. 1-20, map, pls. i-ii.
- 1941b. Zool. Anz., **135**, pp. 225-242.

VIEIRA, A. X. V.

1886. O. Inst. Rev. Sci. Litt. (Coimbra), (2), **34**, pp. 234-241 (herpetology on pp. 237-238).

VILLIERS, ANDRE

- 1948a. Bol. Cult. Guiné Portuguesa, No. 9, pp. 201-204.
- 1950a. La Collection de Serpents de l'É. F. A. N., Catalogues VI, Inst. Franç. Afrique noire. (Dakar), 1-155 pp., figs. 1-12.
- 1950b. Bull. Inst. Franç. Afrique noire, **12**, pp. 984-998.
1951. Étud. Dahoméennes, No. 5, pp. 17-43, 2 pls.
- 1951a. Bull. Inst. Franç. Afrique noire, **13**, pp. 813-836, figs. 1-3.
- 1952b. Bull. Inst. Franç. Afrique noire, **14**, pp. 881-898.
- 1954b. Bull. Inst. Franç. Afrique noire, **16** (A), pp. 1234-1237, figs. 1-2.
- See also P. L. DEKEYSER and A. VILLIERS

WERNER, FRANZ

- 1895b. Verh. Zool.-Bot. Ges. Wien, **45**, pp. 190-194, pl. v.
 1897b. Verh. Zool.-Bot. Ges. Wien, **47**, pp. 395-408.
 1898. Jahreshb. Abhand. Naturw. Ver. Magdeburg, 1896-1897, pp. 139-148.
 1898a. Verh. Zool.-Bot. Ges. Wien, **48**, pp. 191-213, figs. —, pl. ii.
 1899a. Verh. Zool.-Bot. Ges. Wien, **49**, pp. 132-157.
 1901b. Verh. Zool.-Bot. Ges. Wien, **51**, pp. 634-639.
 1902a. Verh. Zool.-Bot. Ges. Wien, **52**, pp. 332-348.
 1903. Abhand. König. Bayer. Akad. Wiss., **22**, pp. 381-384, pl. —.
 1907. Akad. Anz. Wien, **44**, p. 479.
 1908. Sitzb. Akad. Wiss. Wien, **116**, Abt. 1, pp. 1823-1926, pls. (1907) i-iv.
 1908a. Third Rep. Wellcome Trop. Res. Lab. Khartoum, pp. 169-172, fig. 42, pls. xvii-xx.
 1909c. Jahreshb. Ver. Nat. Württemberg, **65**, pp. 55-63.
 1909d. Jahrb. Hamburg. Wiss. Anst., **26**, pp. 205-247, figs. 1-14.
 (1908)
 1910a. Denkschr. Med.-Nat. Ges. Jena, **16**, pp. 279-370, figs. 1-15.
 1913a. In A. Brehm, Tierleben. (Leipzig), ed. 4, **5**, xvi + 598 pp., figs. —, maps, pls. —.
 1913b. Denkschr. Akad. Wiss. Wien, **88**, pp. 714-719, pl. i.
 1915c. In W. Michaelsen, Beiträge zur Kenntnis der Land-und Süßwasserfauna Deutsch-Südwestafrikas. III. (Hamburg), 325-376 pp., pl. vii.
 1923c. Ann. Naturhist. Hofmus. (Wien), **36**, pp. 160-166.
 1924b. Sitzb. Akad. Wiss. Wien, **133**, Abt. 1, pp. 29-56, figs. 1-9.
 1925. Arch Naturg., **90**, Abt. A, pp. 108-166, figs. 1-18.
 (1924)
 1925. Sitzb. Akad. Wiss. Wien, **134**, Abt. 1, pp. 45-66, figs. 1-4.
 1929a. Zool. Jahrb. Syst., **57**, pp. 1-481, figs. 1-48.

WITTE, G. F. DE

- 1927d. Revue Zool. Afr., **15**, pp. 320-332.
 1928i. Revue Zool. Bot. Afr., **16**, Suppl., p. 9.
 1933j. Revue Zool. Bot. Afr., **24**, pp. 111-123, figs. —.
 1933m. Ann. Mus. Congo belge, Zool., (1) **3**, pp. 55-98, pls. i-iv.
 1941. Exploration du Parc National Albert. Mission G. F. de Witte (1933-1935). Batraciens et Reptiles. Inst. Pares Nat. Congo Belge, Fasc. 33, xviii + 261 pp., figs. 1-50, map, pls. i-xlvi.
 1952. Exploration Hydrobiologique du Lac Tanganyika (1946-1947). Inst. Royal Sci. Nat. Belgique, **3**, Fasc. 3, 1-22 pp., pl. i.

1953. Exploration du Parc National de l'Upemba. Mission G. F. de Witte en collaboration avec W. Adam, A. Janssens, L. van Meel et R. Verheyen (1946-1949). Reptiles. Inst. Pares Nat. Congo Belge, Fasc. 6, 1-322 pp., figs. i-iii, pls. i-xli, map.
1955. Bull. Séances Acad. Roy. Sci. Colonials (N.S.) 1. pp. 203-225.

WITTE, G. F. DE and R. LAURENT

- 1943a. Revue Zool. Bot. Afr., 37, pp. 157-189.
1947. Mem. Mus. Royal Hist. Nat. Belgique, (2) fasc. 29, pp. 1-134, figs. 1-132.

WORTHINGTON, E. B.

1929. A Report on the Fishing Survey of Lakes Albert and Kioga. (Cambridge, Eng.), 1-136 pp. (herpetology on pp. 122-124).

ZAVATTARI, EDOARDO

- 1930b. *In* S. E. E. de Bono, Missione scientifica per l'Eritrea. (Parma), 171-205 pp., figs. 1-19.